RAILROAD GAZETTE

FRIDAY, MARCH 13.

Contributions.

Light Rails and Railroads.

SHOE HEEL, N. C., Feb. 3, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I wish to give, as a point of departure for discussion, my views on certain points of railroad construction which are of considerable practical interest to many in these parts.

I will say, as briefly as possible, that I have been decidedly in favor of putting into practice some very considerable modifications of the usual forms and methods of construction, to meet the necessities of particular cases.

I have advocated in many instances the use of rail weighing from 30 lbs. down to 20 lbs. per yard with engines and cars to suit; and rails of 40 lbs. in some cases in which the engines (occasionally) and the cars ordinarily in use on main lines in our section might be expected to pass over the proposed lines.

In all these cases, where the weight of rolling stock required, and cheapness of timber would justify it, as is generally the case, I would increase the number of ties. My reasons for the use of the latter rail, 40 lbs., in some cases, are not wholly theoretical, since in practice I know of 40-ton engines and ordinary cars running successfully over just such rail at fair speed. As to the lighter rail I have had some observation on the narrow gauge, but none with the standard, 4 ft. 8½ in.

I am, however, decidedly of the opinion that judicious use might be made of such rail, with standard gauge, even down to as low as 16 lbs., certainly to 20 lbs.

In some instances I have favored the narrow gauge; particularly where trade was largely local, and to a terminus of considerable importance, itself furnishing the bulk of trade to the road.

I favor a special section of light (16 or 20 lbs.) rail with narrow head of about the width that in the larger rail appears usually to receive all or nearly all the load until the rails are considerably worn, or even a somewhat less width. With such light rail I would put ties as close together as reason would allow, and the necessities of maintenance of way; to permit passage of cars (but not engines) from other lines.

The reason of all the foregoing is sound economy and adaptation of means to ends. It is perhaps difficult for those living in a section whose roads are crowded to their utmost capacity, where growth is rapid, and population and trade already large, to understand fully the necessities of the situation in some parts of our country. Take a region which is at present thinly settled and little developed, which is yet a fair agricultural section, with some timber, occasional mines, and other resources. We have no public lands to give away, nothing to attract rapid immigration, no reason to expect speedy growth. A road to reach or traverse our (supposed) section would not lie in the direction of the great lines of trade or travel; but must we do without one altogether, or wait for years that we may grow? To this I say, No! Have a railroad, if you have to build, on the plans described, and indeed *because* you can build on such plans, and operate, too, successfully, but have a railroad.

Consider the questions proposed and give us an answer. It may do much good.

C. H. SCOTT.

Light Rails and Narrow Gauge.

WRIGHTSVILLE, Ga., Feb. 21, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Can you or some of your correspondents give me some information on the following points:

1. I read a few years ago an account of a road (in Maine, I think), which was built as a narrow-gauge, using a 25-lb. rail. Afterwards it was changed to a standard gauge, and a tolerably heavy traffic was carried on for several years before a heavier rail was substituted. Can you give me any more definite information in regard to this road? 2. Has any road in the United States ever been changed from standard to narrow gauge? 3. Have you any statistics showing how many roads in the United States have been changed from narrow to standard gauge?

NARROW GAUGE.

[1. The road referred to, doubtless, was the Billerica & Bedford, of Massachusetts, of 2 ft. gauge, which was operated a very short time. The rails and rolling stock were then taken to Maine and used in the construction of the Sandy River Railroad, 18 miles long, also of 2-ft. gauge, which has been regarded as successful, but for two years preparations have been made to change it to the standard gauge. It is not yet changed. Its capital account is $8,420 per mile. In the year to Sept. 30, 1884, it earned $1,143 gross and $104 net per mile of road, the net earnings being about 1¼ per cent. on the investment. There are two other 2-ft. gauge railroads in Maine, the Monson Railroad, six miles long, which was built chiefly for carrying slate from the quarries to the Bangor & Piscataquis Railroad at Abbott; and the Bridgton & Saco River Railroad, 15¼ miles, which has a capital of $12,930 per mile and during the 11 months that it was open last year earned $1,150 gross and $290 net per mile.

2. There have been several cases where a company building a narrow-gauge railroad has secured an old standard-gauge road of short length and made it part of its line by changing its gauge. The old King's Mountain Railroad, of South Carolina, was thus made a part of the Chester & Lenoir; the Iron Railroad, of Ohio, went in to the Toledo, Cincinnati & St. Louis; and the Paw Paw Railroad (four miles), of Michigan, was joined to the Toledo & South Haven.

3. We have no complete statistics. Among them are the Des Moines & Minneapolis, the Galena & Southern Wisconsin, the Philadelphia & Atlantic City, the Bell's Gap, the New York & Manhattan Beach, while there are several others which it is now proposed to change, some of them of considerable length —EDITOR RAILROAD GAZETTE.]

Angle Fish-Plates.

NO. 22 GREAT GEORGE STREET, WESTMINSTER. LONDON, Jan. 31, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have just received your paper of 16th inst., which gives a section of the "Heaviest Rail in America." It certainly ought to be a strong rail, judging from the design, and should not deflect much even at the ends. Then why brace up the rail joint with angle fish-plates? Surely they are not required in this case, and will do the rails no good. The chances are these fish-plates will act like an anvil for the wheels to hammer the rail-head over. I take it that a plain fish-plate is quite sufficient for a strong rail, and that it is rather the weaker sections that want strengthening at the joints.

It seems to me that the tendency nowadays is to make joints too stiff, and we have facts before us that go to show this, such as the boiling over of the rail ends when the rails have not gone in the middle. It may be soft steel, but I am strongly of opinion that it is owing to joints being too rigid. Of course, I do not dispute that an angle fish-plate may be useful in some cases, but not desirable in all, and decidedly not in this instance, the flange of the rail being a very broad one, which stiffens the rail, as we know by testing. These angle fish-plates make a good fit with the rails on paper, but it is a difficult matter to keep the fit in practice, as I know by looking after thousands of tons.

As for the particular angle fish-plates illustrated in your paper, I fail altogether to see how the joint is to be tightened up. How can the fish-plate move in with that angle that is underneath it, and which corresponds to the angle on the top of the rail flange?

F. G. FIELD.

[Since the ideal rail is one which has no joints at all but is equally stiff at all points, and since neither the angle fish-plate nor any other yet introduced fully attains this end, it is difficult to see how any increase of stiffness which does not make the joint stiffer than the rail itself, regarded as a continuous beam, can be anything but a gain. However stiff and heavy the rail itself may be, the *ratio* of its strength to the strength of the joint is sensibly the same. The flowing of the metal at the joints is commonly regarded as resulting from the weakness and not the strength of the joints, and certainly no practical disadvantage of the kind referred to seems to have been found to result from angle plates, but directly the contrary.

The angle fish-plate is an American invention and has made its way into general favor with great rapidity, even for this country, as will appear from the letter below, giving the history of its introduction. It is now in all but universal use in this country for new rails of any weight or pattern, and it would require some courage, and create some astonishment at a rail mill, to order plain fish-plates for any large order of rails intended for first class track. The chief motive for this, we apprehend, has been the gain in stiffness, although the stopping of creeping is also important. In addition to the notes of European introduction in the letter below, angle fish-plates seem to be rapidly growing in favor in Germany, and perhaps in other parts of Europe, although largely in the form of one angle-plate and one fish-plate combined, which was early abandoned here.—EDITOR RAILROAD GAZETTE.]

Chief Engineer's Office, Pennsylvania Railroad Company, PHILADELPHIA, Feb. 13, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Answering your favor of the 12th inst., in regard to the history of the introduction of angle fish-plates into this country, I would say, previous to 1870 we had a great deal of trouble from the creeping of the rails on the Susquehanna Bridge above Harrisburg. This bridge was a wooden Howe truss with arches, for a single track, with a 7-degree curve at the east end and a 5¾-degree curve at the west end of the bridge. We have taken as much as 4 ft. of rail out of the eastern curve at a time and added it to the western curve. We tried for some time different kinds of chairs and anchor straps, but without any satisfactory results. We were then using the ordinary plain fish-bar, and in order to avoid drilling our steel rails through the flange, thereby running the risk of breaking, we had a lot of angle splice-bars made of cast iron in Harrisburg. They had four bolt-holes and were of the same shape as the angle-splice now in use on the Pennsylvania Railroad. In order effectually to stop the creeping of the rails, we had the bolts in one end of the rail screwed up very tight and the other left comparatively loose; this, of course, anchored one end of each rail and most effectually stopped the creeping. In the course of the usual repairs on the track, however, both ends of these bolts were screwed up in a similar manner to that on the ordinary track, when it was found that, on account of the long flat base resting on the stringers and having four spikes to each joint, it still entirely prevented the rails from creeping, and the joints on the bridge gave us less trouble than on any other part of the road. These splices were then made of wrought iron for use on the main track between New York and Pittsburgh, using only one angle splice on the outside of the rail, on the score of economy, with the plain splice inside, but we soon found that this was apt to cause a short "kink" in the rail about 12 in. from the end, because the inside of the rail still had a tendency to creep, which was prevented on the outside by the flange-bar. Since we began using the angle-bar on the inside and outside, we have had no trouble of any kind, either in the creeping of the rails or in lateral deflection from the true line on account of the joints. We find, however, that the practice of repair men is to "tamp" the joint ties a little higher than the other ties under the rail, which has the tendency to make the rail ends spring upward whenever a driving-wheel is on each side of the joint, and the only trouble we have had from our angle splice has been from the cracking through the top edge. In other words, the splice broke upward instead of downward, as per sketch inclosed. We are now remedying this by using the splice with a heavier top chord, something similar to the one used on the Lehigh Valley Railroad [illustrated in the *Gazette* of Dec. 21, 1882], a drawing of which we send you herewith. This, we hope, will obviate the only trouble that we have had with the angle splice-bars.

The first splice used on the Susquehanna Bridge was early in the spring of 1870, and has been in continuous use on the Pennsylvania Railroad ever since. In 1873 or 1874 a party had this bar patented, but he acknowledged that he got his idea from the splice on our Susquehanna Bridge, and, of course, his patent is good for nothing, as we had it in use three or four years before his patent was issued. In 1876 we furnished the Chief Engineer of the Belgian Railroads, in Europe, with our specifications and drawings of the standard track of the Pennsylvania Railroad, and, when I was over there, two years ago, I noticed that the new track that they were building was built very closely in accordance with our specifications and cross-section; but I have never known it to be used in any other part of Europe. I think, however, you will find they are used very extensively in Belgium on the state roads belonging to the government, and, I believe, on some parts of the road up the river Rhine (east side).

WM. H. BROWN, Chief Engineer.

Pittsburgh, Cincinnati & St. Louis Railway Co., COLUMBUS, O., Feb. 19, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I must certainly take issue with your English correspondent, regarding the utility of angle-bars and his objection to the same.

Our experience is that the trouble, if any, is owing to the fact that the joints are not stiff enough, and the present tendency is toward increasing the sectional area of the angle-bars, especially enlarging the upper flanges under the rail-head so as to increase their stiffness and give better support to the rail ends.

The pattern adopted by Mr. Sayre, formerly of the Lehigh Valley Railroad, which has also been adopted in a slightly modified form by the Pennsylvania Railroad, shows the tendency in that direction.

In regard to the history of the introduction of the angle-bars in this country, I think I am quite right in my recollection that at least the double angle-bar was first used on the Columbus & Hocking Valley Railroad, the principal offices of which are in this city. Mr. M. M. Greene, the President of that road, had experienced considerable trouble with his steel rails as first laid in 1873, on account of their breaking, if slotted in the base for the insertion of spikes to arrest creeping, and he was induced by these difficulties to address a number of engineers throughout this country, with a request to suggest to him a splice which would do away with the necessity of slotting the base of the rail and at the same time prevent creeping of the rails. In response he received from Mr. O. Chanute, then Chief Engineer of the Erie Railway, a section of a very heavy rail with a very heavy splice-bar on each side of the rail, reaching under the rail-head, filling the entire space between head and base and extending a little outside of the base, which joint had been in use on the Erie Railway at an early date, but had been abandoned.

From this crude joint Mr. Greene conceived the idea of having a splice made very nearly corresponding to the form now generally in use, and he had it manufactured by the Cleveland Rolling Mill in 1874, but applied it only to the outside of the rail in his track for reasons of economy.

Mr. D. W. Caldwell, who was then General Manager of the Pittsburgh, Cincinnati & St. Louis Railway, had his attention called to Mr. Greene's joint and adopted it at once for the lines under his control, using it double—that is, one angle-bar on each side of the rail. This was in 1874-75.

The Pennsylvania Railroad adopted the splice, using the angle on the outside and a straight fish-plate on the inside about the same time, and used the single bar long after the Pittsburgh, Cincinnati & St. Louis Railway had adopted the double angle-bar.

As you will see from the enclosed lithograph, it was still their standard in that form in February, 1875, and even as late as 1877, fully two years after the double angle-bar had been in use on the so called Pan Handle line, the Pennsylvania Railroad still adhered to the mixed splices; but about the year 1876 the double angle-bar became generally used

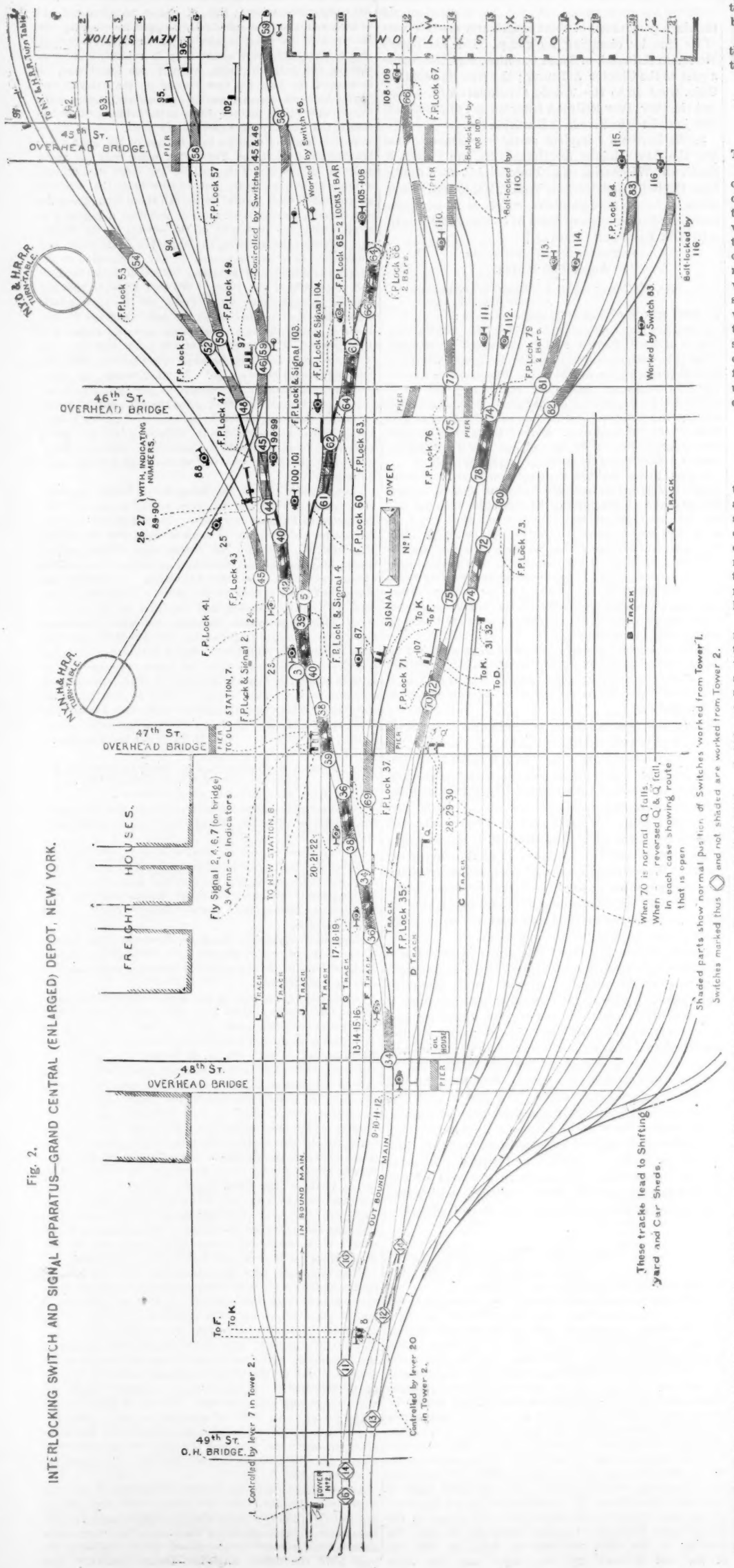


Fig. 2.

INTERLOCKING SWITCH AND SIGNAL APPARATUS—GRAND CENTRAL (ENLARGED) DEPOT, NEW YORK.

throughout this country on the leading railroads, and has been continued with slight modifications ever since.

It certainly is a purely American device, and I think that the credit of its introduction is due to Mr. M. M. Greene, of the Hocking Valley Railroad.

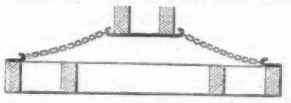
M. J. BECKER, Chief Engineer.

Useful and Useless Check-chains.

Boston & Albany Railroad Co.,
ALLSTON, Mass., March 2, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read the article on "Check-chains" in the *Gazette* of last week, and could come to no other conclusion than if check-chains are put on so recklessly and with so much slack, they are utterly useless; but if put on properly, so that they will be strong enough to hold when required to do service, they are a good safeguard. I have seen a great many that I consider an entirely useless waste of money, as they would do no good if brought to a strain—not only because the chain was too weak and small, but because it had too much slack; so that if the truck was at once brought up by them they would break from the strain, as the blow is the harder and the advantage taken of the chain the greater the further it swings around. I presume that you have noticed that we put on our check-chains differently from most other roads; in fact, I do not know of any that applies them as I do. First, I use a good strong ⅝ chain, and run the chain on the outer end of the truck from a heavy strap fastened to the two centre



timbers of the car-body, with a strong hook on each end of it, and the chain extends to the corner of the truck, as in the sketch, holding the truck so that it can only swing just outside of the rail. The slack just allows the wheel to fall outside of one rail and inside the other. I have tested it carefully, and make the chains just as short as is possible for the car to run the curves that are in main track and regular sidings. When necessary to go into the shop yard on sharper curves, we unhook the chains.

On the rear or inside end of the truck the chain is reversed, running from the centre, or near the centre, of the truck to the side of the body, and instead of fastening to the sill direct we put a plank across the car, bolting to each sill, and to this secure the chains, adjusting the length so the two chains opposite on diagonal corners will come taut alike and help each other.

I believe in check-chains for passenger cars if rightly applied, but have no faith in them if not. Our truck has 7 ft. wheel base. The slack depends, of course, upon the length of truck. F. D. ADAMS, Gen. Mas. Car-Builder.

[We have also received a letter from an officer of a prominent line stating an intention (which it is to be hoped may not be used for paving a place that we will not mention, like so many other good intentions) to test practically by derailments how much or little additional security may be really obtainable by quickly-acting check-chains, permitting no more swivelling than is absolutely essential for daily service on main line and *ordinary* turn-out curves.—EDITOR RAILROAD GAZETTE.]

Interlocking Switches and Signals, Grand Central Depot, New York.

The Grand Central Depot, which is perhaps the most important passenger station in the country, is being greatly enlarged and the switches and signaling arrangements have been considerably modified and improved to meet the increasing volume of local and through passenger traffic. Owing to the large size of the station, the great number of trains, and the large amount of switching, the arrangements for interlocking the switches and signals are necessarily on a very extensive scale, and will probably for some years to come afford one of the best examples of an interlocked and fully signaled railroad yard to be found in this country. Some description and illustrations of the yard, showing the arrangement of switches and signals and views of the interlocking arrangement and signals, will therefore probably be interesting to our readers.

In the system we are about to describe each signal is a unit in a comprehensive and intricate scheme; intricate in the relation of each signal to its fellows, or to its surroundings, and yet simple in that it presents to the engineman never more than one of two plain, unmistakable meanings.

A model of the Saxby & Farmer system was exhibited at the office of the Broadway Underground Railway as early as October, 1873. The Pennsylvania Railroad is credited with the erection of the first complete machine, placed in use on its road at East Newark early in 1875. To John M. Toucey, however, belongs the credit of the first practical introduction of interlocking into this country. The first machine of the Brierley patent was put into service on the New York Central in August, 1874. This machine not proving satisfactory, was replaced in May, 1875, by one invented conjointly by Messrs. Toucey and Buchanan. The same year a similar machine was put into service at the Fifty-third Street cross-over, with excellent results. In 1876, the Pennsylvania Railroad placed two of the Toucey Buchanan machines upon its grounds at Philadelphia, and the immense business of that year was with their aid conducted with an economy, safety and speed gratifying to the management as it was surprising to the public.

The first complete machine was placed in use in 1875, and it will be seen, according to the statistics set forth in our

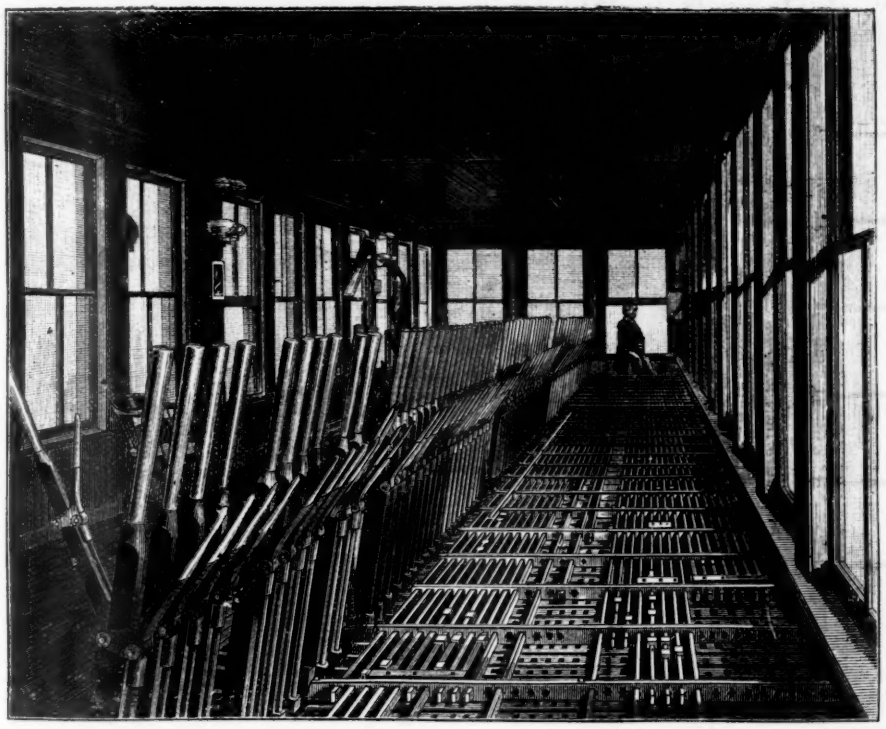


Fig. 1.—INTERIOR VIEW OF SIGNAL TOWER NO. 1—GRAND CENTRAL DEPOT.

issue of Sept. 19, that the system has made slow progress on our roads so far. This is not to be wondered at when it is considered that heretofore it has been comparatively easier and cheaper to buy more room for tracks, and to put them down, than to make the very best use of the track room available; for it will be noted that, given unlimited track room, or track room unlimited as regards the amount of traffic, the interlocking does not then become such a matter of prime necessity, and accident becomes possible only from defective way, or rolling stock, or train rules and discipline, or where the simplest and most imperative precautions for signals are neglected. Land is now, however, becoming scarce; in the vicinity of large cities its purchase is becoming a matter of extreme difficulty, to say nothing of the tremendous cost which the maintenance of a large and unwieldy yard entails. The same conditions are now becoming prominent here that have long obtained in thickly settled countries, and the interlocking is now gaining a fair foothold and recommending itself everywhere to favor. The Union Switch & Signal Co. has been, in the face of much trouble and some loss, pushing the introduction of this admirable system with vigor and energy, and is to be congratulated on the progress made so far.

The problem of signaling at the Grand Central Depot has been complicated by the following considerations:

1. The very considerable traffic has to be conducted in a comparatively restricted area. In the busy season there are from 100 to 120 train movements in an hour.

2. The tracks are crossed by a number of street bridges, placed very low down, and permitting a clear view only in one or two directions.

3. A crossing is made just at the mouth of the depot, at Fifty-third Street, the in-bound track (the right-hand track) ecoming a left-hand track; and the out-bound, starting on left, becoming right-hand.

4. Fly switching. The engines to inbound trains cut loose from the cars about six lengths from the switch, going into the depot on straight track at speed. The cars, following with the momentum left them by the engine, are switched into one or other of several tracks after the engine has cleared the switch.

5. The necessity of using the fewest number of levers possible, owing to the requirements of space and traffic.

These difficulties have been overcome as follows:

1. By a judicious plan of tracks, permitting movement freely in every direction, and by the use of the double and single slip switches (figs. 4 and 5) introduced here for the first time by the Union Switch & Signal Co. (It will be noted that there is not in the yard a single ordinary cross-over).

2. By the use of signals placed low down, by the careful placing of the few semaphores, and by causing the most important of these latter to display letters or numbers by night and day in addition to an arm indicating a general direction (as shown in fig. 3). Thus, instead of using a post with a number of blades, each indicating a particular track, which would not be possible or advisable here, one blade points out particularly several tracks, as will be described in detail.

3. By a system of bell signaling between towers 1, 2, and Fifty-third Street, each operator is warned of whatever movements are about to take place in his direction. In this connection, wherever it is necessary, one man mechanically controls the movements of the other's signals, so that both must be in accord before the signal can be given, and either is able to put the signal to Danger.

4. By an ingenious method, one lever is made to work two, three, or four more signals or numbers.

The following simple yet excellent notice to trainmen of the Harlem Line, and a reference to the annexed plan of the yard, will serve as a good general description of the signaling.

HARLEM LINE.

Special Notice to Enginemen, Trainmen and others concerned, regarding additions to interlocking Switches and Signals, Signal Tower No. 1. To take effect Sunday, Nov. 9, 1884.

The tracks in the depot are numbered from 1 to 21 inclusive, and a number has been plainly posted over each

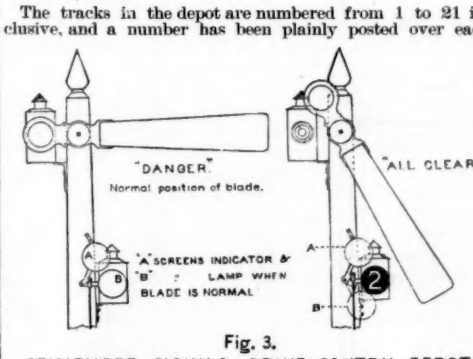


Fig. 3.
SEMAPHORE SIGNALS—GRAND CENTRAL DEPOT.

track, showing its particular number. Employés are required to familiarize themselves with the number and location of the tracks.

All the switches in connection with the old and new depots will be controlled from the tower.

All the old tracks will be governed by signals, worked in exactly the same manner as heretofore, except as described below.

The main out-bound signal [No. 107] north and west of tower will now have two blades.

The TOP blade will govern trains proceeding on out-bound main; the LOWER blade will govern trains proceeding to siding D.

In-bound Trains.

Engines will be cut off and fly made as heretofore. This must be done at Tower No. 2, so as to give *three clear car lengths between engine and cars when the former arrives at fly switch.* Engines will now run on straight track and will be governed by the MIDDLE blade of the three-arm fly signal placed on the bridge.

The TOP arm of this signal will control trains going to the old depot, and when the arm is lowered *a number will be shown* to indicate upon which track the cars have been turned.

The LOWER arm will control trains going to the new depot. The figure 7 will be shown when switches are set for track 7. When the letter D is shown it will indicate that switches are set for one or other of tracks 1 to 6, and trainmen will then look out for signal 26, placed a little farther on, on east side of track No. 6. This signal when lowered will show a number, indicating upon which track the train will be turned.

The object of showing these numbers is to give timely warning to brakemen as to the track upon which they will be turned, so that they can brake train accordingly. If arm is not lowered, or number shown, the brakes must be applied at once.

North-bound shifting from new tracks: Trains will be governed by signal placed on the right-hand side of each track at the fouling point. A route signal [No. 89], nearly opposite tower between round houses, will govern trains on tracks 1 to 7, and will indicate by number which track is set.

A dwarf signal [No. 97] having three arms is fixed east of track 7. The top arm is for New Haven engines. The middle arm is for Central engines. The lower arm is for crossing. Switch indicators will control engines on tracks 7 and 8.

South-bound shifting on out-bound main and on track *D* will be governed by two signals [No. 28] placed on the 47th street bridge. When one of these signals is lowered, a letter will be shown to indicate which track is set.

W will indicate one or other of tracks 12 and 14.
X will indicate 15 and 16.
Y will indicate 18 and 19.
Z will indicate 20 and 21.

A small semaphore signal [No. 31] has been fixed for siding *C*, in place of the ground disc signal formerly used.

Red or danger signals for a designated track must never be passed when they show danger.

J. M. TOUCEY, Manager.
J. H. FRANKLIN, Depot Master.

The following will show the method of working the flying switch signal:

The operator, having received notice that a train is approaching, assures himself of the track room available and decides upon which track to place the inbound train. Let him, for instance, decide to place it on track No. 5 in the new depot. He sets switches and locks 40, 42, 44, 48, 58, 57, 49, 47, 43, 41, lowers signal 27, and pulls levers 4, 2 and 1, and this lowers the middle arm, as described, and permits signal at No. 2 tower to be cleared. The train now rushing into the yard finds the middle arm at clear, and, assured that every thing is all right, the engineman breaks loose from the train and runs on to the engine siding ahead of it. The fly switch is almost immediately opposite tower, but to insure that under all conditions of weather the operator may know exactly the position of the locomotive, an electric bell begins to ring the moment the first wheel approaches the detector bar, and continues to ring until the last wheel has passed over the switch. The operator immediately reverses his bar, changes his switch and locks it, and the act of his doing so throws up the middle arm, lowers the bottom arm and displays a number, all at the same time. The brakeman on the front of the advancing train, seeing the bottom arm lowered, knows his general direction and is assured that one of the tracks in the new station is set for him. He then looks for signal 27, which has of necessity been lowered and shows the number 5, and then looking upon this track brakes train accordingly. Our explanation is necessarily somewhat extended, but the act of making the fly itself occupies but a moment.

The perspective view of the interior of the signal tower gives a very good idea of the inter-locking mechanism, which

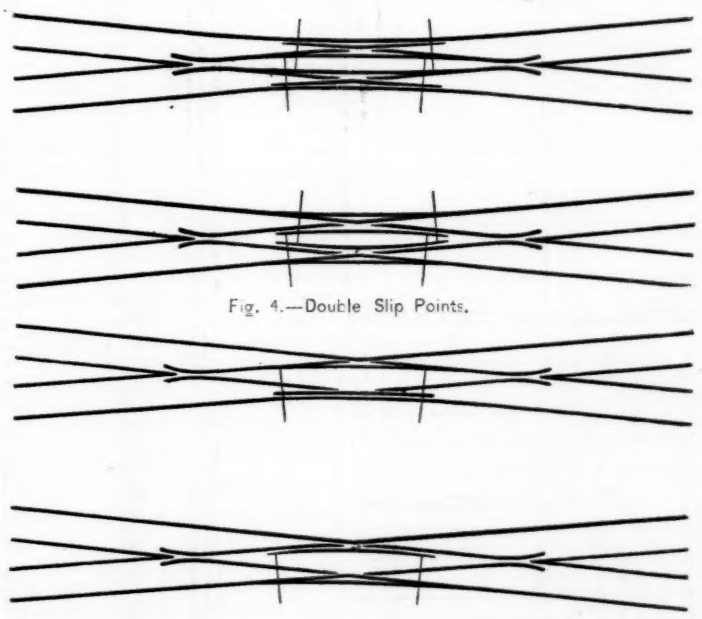


Fig. 4.—Double Slip Points.

Fig. 5.—Single Slip Points.

DOUBLE AND SINGLE SLIP SWITCHES—GRAND CENTRAL DEPOT. (See Fig. 1).

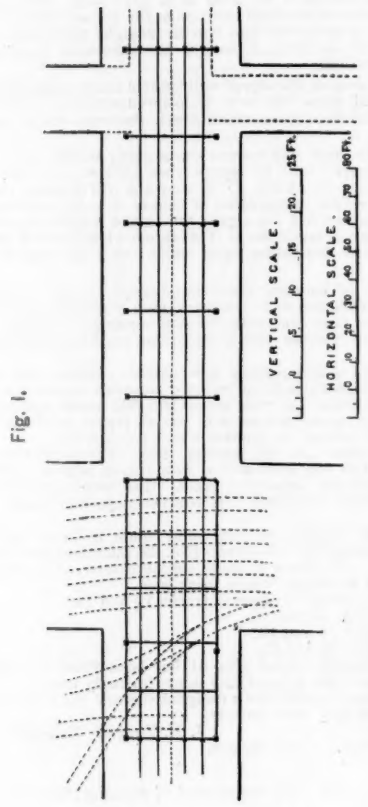
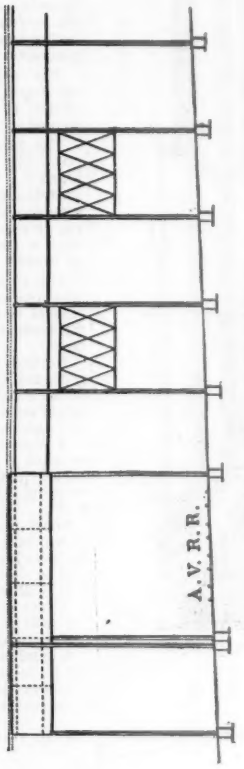


Fig. 1.



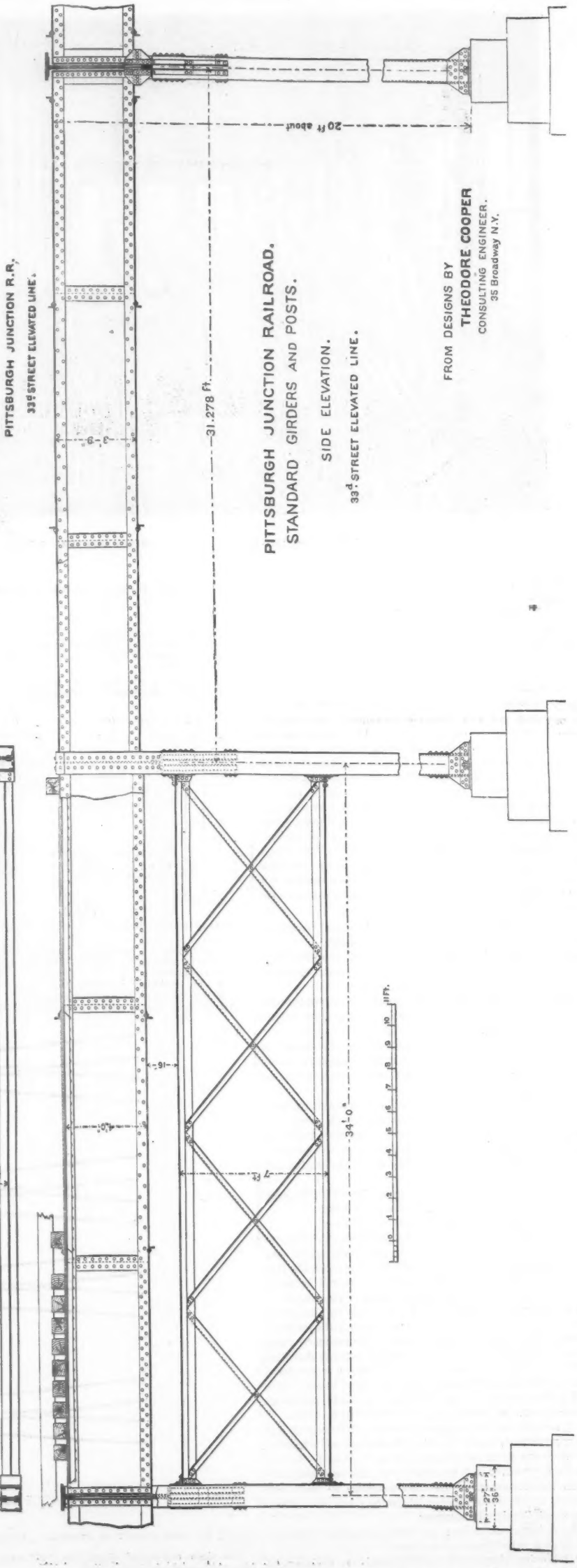


Fig. 4.

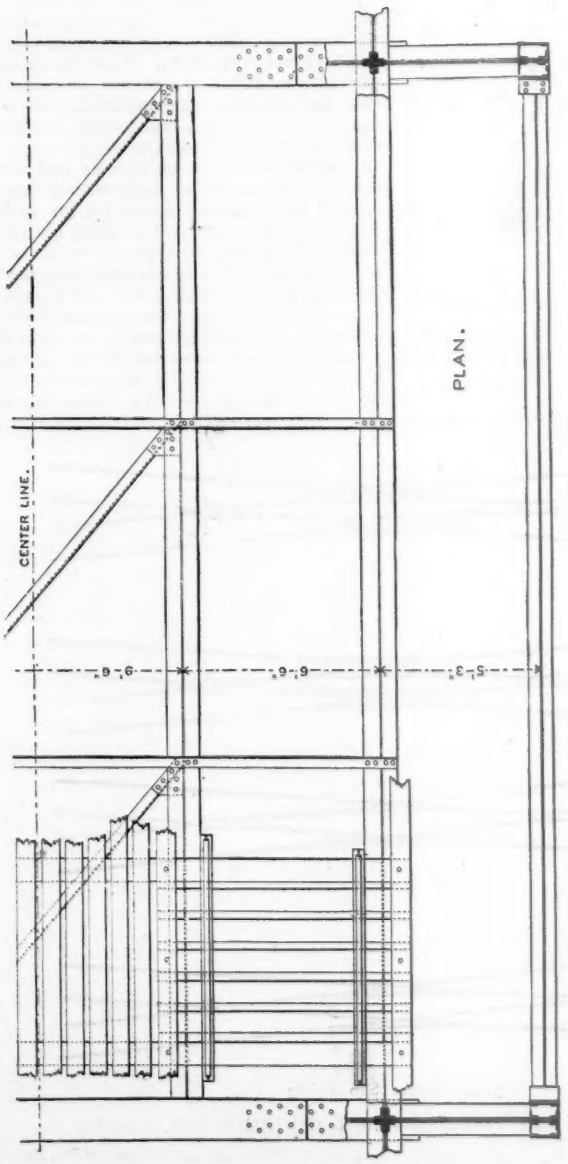


Fig. 5.

Fig. 3.

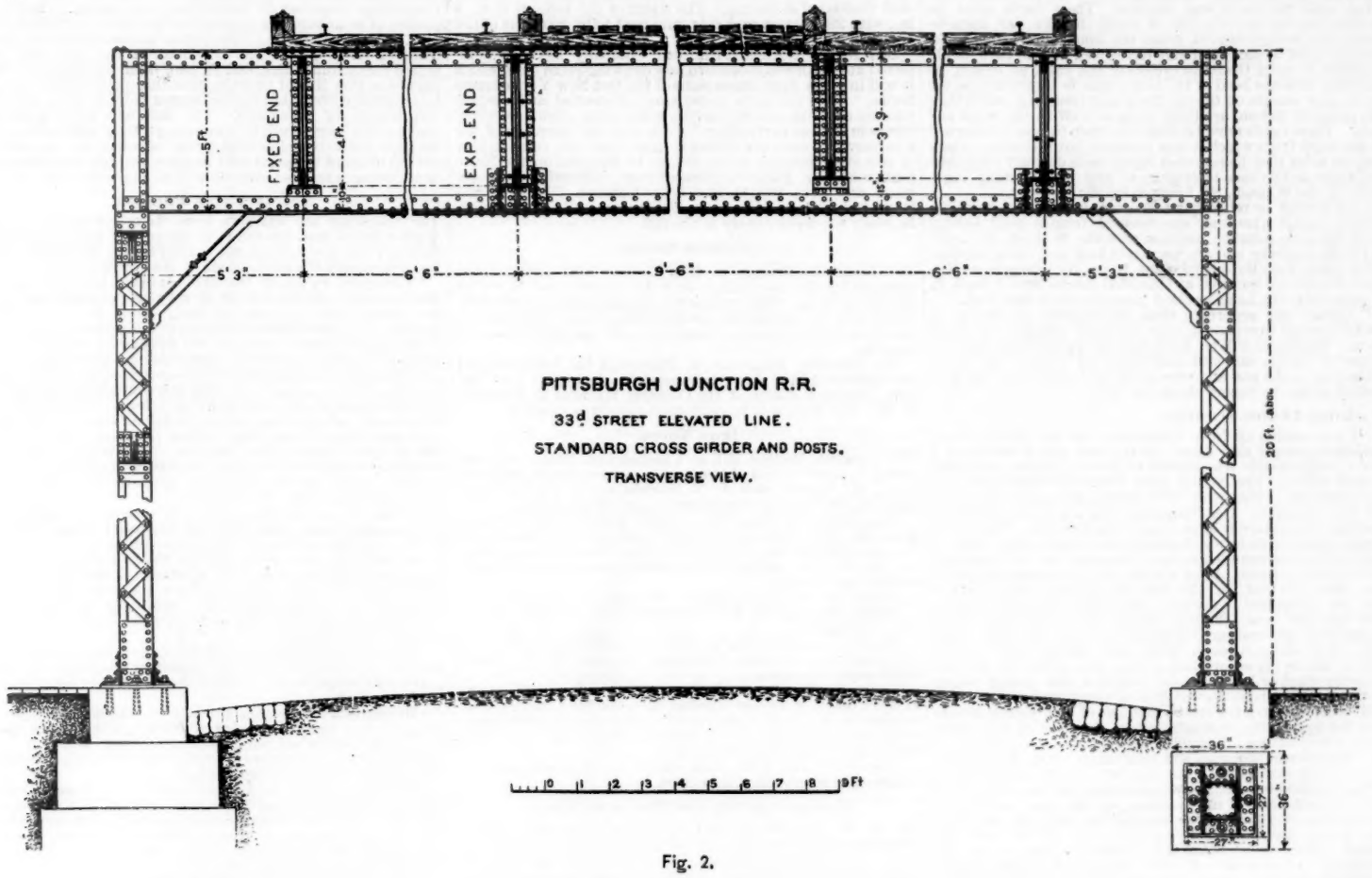


Fig. 2.

may be described as a huge combination lock, in which all possible combinations for the movement of trains are thought out, provided for, and mistakes prevented. The locking is Saxby & Farmer's preliminary, for which these engineers have obtained a world-wide and deserved reputation. In prior inventions the locking was completed only when the lever had fully completed its stroke. In this, conflicting levers are locked prior to the *intended* movement of a lever. It is as if one would think out all possible dangers and provide for them before taking a step in advance, and is especially useful in a large machine, as at the Grand Central Depot, where two switchmen are required. Behind each lever is a small catch-rod, which must be moved before the lever can be reversed. The act of moving this rod rocks a bar transversely the length of the machine, and locks conflicting levers in advance, so that if both operators start simultaneously to make movements, one of which conflicts, one operator locks the other, and no movement can result until both are in accord as to the proper movement to be made, both, however, being free to make, at the same time, movements which do not conflict. The following extract from the locking sheet for this machine, and reference to the diagram, will illustrate the locking just described:

Lever.	Releases.	Locks.
*	*	*
5		1, 4 b. s., **62**, 100, 101. *
6	(or 7) 1.	(**26** or **27** when **44**), **40, 41, 42, 43.** *
7	(or 6) 1.	**60, 62** (**63** when **61**), (**65** when **61** and **64**), 100, 101, 103 (104 when **61**), (105, 106 when **61** and **64**), (108 when **61, 64, 66**). *
8		**9** or **10** or **11** or **12** or **13** or **14** or **15** or **16.** *
*	*	*
38	12, 15, 16, 18, 19, 161. *	11 b. s. (14 when **36**), 17, 20, 21, 22, 90 b. s., 98 b. s., 100, 103 b. s., 104, 105 (108 when **64**). *
39	12, 16, 19, 22, 90, 99, 100, 101.*	1, 2, 3, 4 b. s., 6, 7 (11 b. s. when **38**), 15 b. s., 18 b. s., 20, 21 b. s., 41 b. s., 103. *
40	3, 6, 12, 16, 19, 22, 90, 99. *	5, 7, 15, 18, (11 when **38**), 21, 23, 43 b. s., 89 (15, 18, 21 when **39**), 98, 100, 101. *
41	6, 12, 16, 19, 22, 89, 90, 99. *	39, **39**, 42, **42.**
42	6, 12, 16, 19, 22, 91, 92, 93, 94 95, 96. (97 when **45** and **46** are home), 89, 90. *	23 b. s., 41 b. s., 45, 46, 98, 99.*
43	6, 12, 16, 19, 22 (23 when **42**), 26, 27, 89, 90, 91, 92, 93, 94, 95, 96 (97 when **45** and **46** are home), 98, 99. *	40, **40**, 44, **44.** *
*	*	*

B. s., between stroke.
Fullface figures denote reversed position of levers.

The figures given in the "Release" column mean, for instance, taking lever 43, that lever 43 *locks* all the levers named until lever 43 has been *moved first*. In the "Lock" column, taking lever 7, all the levers named are locked until 7 has been *put back into its normal position*. If, now, lever 7 controls a signal to five or six routes, it will be seen how important this locking becomes.

Again, it will be noted that 6 or 7 releases 1. This means that before 1 can be pulled, 6 *or* 7 must be pulled first. The object is that 1 being for the distant signal (at No. 2 tower), it is necessary that some track shall be clear before the distant signal is given. Again, 6 locks 26 *or* 27 in the reversed position when 44 is reversed; which means that when 44 is home, neither 26 nor 27 is required, as the train will be turned on to track 7, for which 26 and 27 have nothing to do; but when switch 44 is reversed, some one of tracks 1 to 6 will be set, and it is necessary that the brakeman on front of the train shall know which track is set; hence 26 or 27 must be lowered. Taking one of the sets of figures in brackets as explanatory of the others, 43 releases (23 when **42**), means, not that 43 releases 23 always, but *only* when 42 is reversed.

It should be understood that in describing this admirable system of signals we do not by any means regard them as so perfect that there is not still a field for ingenuity and improvement. It is, however, the best results of thoughts in this direction so far, and in one form or another is certain to be extended. One of the particular excellencies of the Saxby & Farmer method is that only just enough leverage is furnished to do the work required. In a large yard the operator soon learns to distinguish the amount of work each lever is expected to perform and the stiffness or ease with which it performs its function. If, then, his lever shall upon occasions unexpectedly work easier or harder he will know that something requires adjustment, and for his own ease and assurance will apply at once for the remedy. If his strength was added to by means ulterior to him, such as extra leverage or steam power of any kind, he would not then have this intimate relation or sympathy with the work. He would not *feel* the work under him; such power might be sufficient to overcome resistance for proper cause, and he, unconscious of it, might go on till accident or delay resulted. It will be seen, in fact, that entire reliance is placed neither upon mechanical nor human agency, but that each checks and controls the other.

The apparatus has been erected by the Union Switch & Signal Co. under the supervision and from the designs of their signal engineer, Mr. Charles R. Johnson, assisted and instructed, as to the necessities and movements of traffic, by Mr. J. H. Franklin, Station Master.

Elevated Track of the Pittsburgh Junction Railroad.

In our issue of Feb. 6 we gave a map of the Pittsburgh Junction Railroad and a description of its salient features. We illustrate herewith the structure which carries the line from the Liberty street crossing, where the surface tracks cease, to the river.

From the retaining wall at the west side of Liberty street, a double-track iron trestle extends down Thirty-third street to the Allegheny River, a distance of 1,800 ft., with a clear head room of 15 ft. over all the streets and 19 ft. 6 in. over the tracks of the Allegheny Valley Railroad. The streets are all spanned from curb to curb, so as not to interfere with the street traffic.

A portion of the general plan and profile is shown in fig. 1

The general style of the structure consists of cross girders spanning Thirty-third street, with longitudinal girders secured to the webs of the cross girders. Fig. 2 shows the standard form of cross girders and posts.

The posts are formed of two 12-in. channels with flanges turned in, latticed on two sides. They have wrought-iron bases, which are secured to the pedestal stones by four ⅞-in. bolts. The outer channel extends to the top of the cross girders and is solidly riveted to the end angles of the girders. Corner brackets are placed at every post.

The cross girders vary in depth from 3 ft. 9 in. to 5 ft. All the flange angles are of one size, 6×6 ¾ in., throughout the work, any additional flange area being made up by plates 14 in. wide.

The stringers vary in depth from 3 ft. to 4 ft. 6 in., and are made of four angles and a web-plate only.

Expansion is provided at suitable intervals by resting the ends of the stringers in pockets built on the sides of the web of the cross girders and securing them with a limited movement by eight ⅞-in. bolts.

Longtitudinal stiffness is obtained by longtitudinal struts riveted to the adjacent posts at intervals, as shown in fig. 3. They are placed high enough to allow free passage beneath them.

For the longer spans and where special arrangements had to be made to get the needed headroom, two main longtitudinal girders extend from post to post carrying intermediate cross girders and stringers, as is shown in fig. 1, over the Allegheny Valley Railroad.

The ties are 8×7 in., of oak, spaced 4 in. apart; 8×8 in. guard timbers are placed on each side of each track, notched over the ties, and securely bolted to the stringers underneath by hook bolts at every third tie.

The foundations are of concrete, capped with a pedestal stone.

A branch line to connect with the up and down river lines, starts off near the river. The main tracks of the up and down river branches pass underneath the Thirty-third street trestle on the river bank.

The trestle contains about 1,230 tons of iron. It was built by D. W. C. Carroll & Co., of Pittsburgh, from plans furnished by the railroad company, the designs being prepared by Theodore Cooper, Consulting Engineer, New York.

THE SCRAP HEAP.

Old Time Snow Blockades.

The recent snow blockades in Northern New York have been called severe, but they do not compare with those of 20 years ago. The old Sackett's Harbor & Ellisburg road was then in operation, and running between Pierrepont and the Harbor. In 1865, a train ran through from Pierrepont and was expected back in the evening, but did not return on account of the snow blockade until some time in May, 1866—so say the oldest inhabitants. The cars soon ceased to run at all and have not run since, the road having been abandoned.

Carding Foreign Cars.

Mr. K. H. Wade, Superintendent of Transportation of the Wabash road, issues the following instructions regarding the carding of foreign cars:

"To facilitate the return of foreign cars to the proper junction points, agents at such stations will be furnished with

cards of various designs, showing from what point and from what road the card was received. These cards must be securely tacked to each side of every foreign car immediately upon being received from the connection; two tacks must be used in each card and driven well in, and care should be taken to cover the brass eyelets of the card, as evenly as possible, with the head of the tack; this is important, as the cards may remain on the car for a long time, and unless they are properly put on, are liable to be torn off by the wind and rain. These cards must be removed when the car is returned to the road from which it was received, but under no circumstances must they be removed before such delivery; this does not apply to line cars belonging to any line running regularly on the Wabash, St. Louis & Pacific Railway.

"Cars must be returned to the point where they were received, except when they are received from a road having more than one common junction with the Wabash, St. Louis & Pacific Railway and are wanted to load to or *via* a junction point other than the one received from; for example, a Missouri Pacific car received at Hannibal can be loaded back to Kansas City, St. Louis or other junctions with that road.

"Agents will report to their trainmaster all empty or loaded foreign cars passing over the road without cards on them. Employés will be held strictly accountable for the misuse of foreign cars and must follow all instructions closely pertaining to the use and movement of foreign cars, as prescribed in the car report blank No. 275."

Looking At the Scenery.

"I was coming up from Cedartown on the East & West one afternoon not long since. In the rear end of the coach I saw a young couple who seemed to be very deeply interested in each other. The young lady was well dressed and had nice manners. Her eyes were bright, her cheeks rosy and her lips vermilion. Her companion was a young commercial traveler, whose face is often seen in Cartersville. The young couple appeared to be much pleased with each other, and, in spite of their surroundings, were indulging in soft speeches and melting glances. After a while the young man suggested that they go out on the rear end of the coach and enjoy the beautiful scenery. The afternoon was bright, and the sun was shining across from the west in a genial way, and casting long shadows toward the east. The train sped along through fields, over bridges and around curves, and in my admiration of the fine farms to be seen from my window I had almost forgotten the young couple on the coach. The train was gliding along through an open field, when my eyes fell on the shadows of the young couple reflected against the embankment on the side of the coach where I was sitting. I could distinctly see the outlines of their figures and the profiles of their faces—even the motion of the young man's lips and the shadow of the young lady's eyelashes could be seen. It was amusing to look at, and I called the attention of my neighbor on the next seat to it. Soon almost every one in the car was watching the shadows. The young man seemed to be very earnest and the young lady very attentive. Gently, and as if by accident, the shadow of the young man's arm glided around the shadow of the young lady's waist, and the shadow of the young man's lips was seen to "pucker" and dive at the space between the shadow of the young lady's chin and nose. The passengers in the train became deeply interested, and, as the shadows would meet time after time, a titter would run up and down the line inside the car. 'Dippin' sugar,' said one old fellow down in the corner. 'Gum suckin',' said another. It seemed that I could almost see the sparks of electricity fly out of the shadows on the bank as the lips came together. About this time the whistle blew for town, and the young couple came in looking harmless and innocent like, and the young lady remarked: 'Wasn't the scenery just too lovely?' 'Sweet would have been a better word,' said the old fellow in the corner in a quiet undertone, and everybody laughed like he had said something funny."—*Cartersville (Ga.) American.*

Low-priced Railroad Stock.

Eleven shares of the capital stock of the old Illinois Southern Co. (now part of the Cairo Division of the Wabash), par value $1,100, were sold recently at Mt. Carmel, Ill., for 5 cents. This is the lowest-priced sale of stock we can now recall, although some years ago we mentioned the payment of 100 shares of a Connecticut railroad for a yellow dog.

A Long Train.

What is believed to be the longest freight train ever sent out over the New York Central road left West Albany on Sunday morning last. It was drawn by locomotives numbers 430 and 546 and had 102 cars. How many of these were loaded is not stated.

Give it a Fair Show.

When the Macon & Brunswick Railroad was being built, a half-dozen gaunt-looking Montgomery County crackers came out of the woods one day, and with great seriousness began to examine an engine that was attached to a construction train, the like of which none of them had ever seen before. The solemn crackers walked round the engine in silence, ashamed to show surprise and fear, and trying to appear contemptuous. Having completed the circuit, they paused directly in front of the engine and stood chewing their quids. Finally one broke the silence.

"What yer think on't, Bill?"

"Wall," said Bill, "et's right purty, but it don't peer like it'd make es good time as er steer'r mine." This furnished the cue.

"I reck'n it caint pull more'n two hun'nerd."

"Gimme er good ox team every time," said another, and so on.

Presently the engine gave a blast and started slowly. The faces of the Crackers blanched, but they still stood their ground. When the machine reached within a few feet of them, the oldest, with a sudden show of energy, exclaimed, moving aside:

"Oh! gol darn et, boys, let's give the thing er fa'r showin'." They did so with a slightly accelerated motion, and the thing moved on.—*Macon (Ga.) Telegraph.*

TECHNICAL.

Locomotive Building.

The Mason Machine Works in Taunton, Mass., have an order for four heavy freight locomotives for the Boston & Maine road.

Car Notes.

The Union Pacific shops at Omaha, Neb., have just completed an order for a number of box cars to be used on the Transcontinental fast freight line.

It is said that the Ohio Falls Car Co. is negotiating for the sale of its shops in Jeffersonville, Ind., to the Ohio & Mississippi Railway Co., to be used as repair shops for that road.

The Columbus Iron Works in Columbus, Ga., have begun the manufacture of cast-iron car wheels, and are now filling an order for the Central Railroad, of Georgia.

The Georgia Railroad shops in Augusta, Ga., have just completed two new passenger cars for the road. These cars are 52 ft. long and 10 ft. wide outside; the body is of Georgia yellow pine, the panels of cherry, and the inside is finished in cherry and basswood. The pilasters are of basswood, with cherry rosettes. The windows are large, and the coaches well ventilated at the top. The width of the aisles is 2 ft. 3 in., with 28 seats on each side, and neat toilet rooms at either end.

The Boston & Albany Railroad Company has just completed at its Allston shops two new drawing-room cars, which it will in a few days place on one of the fast New York express trains. They are built in the same substantial and elegant manner as those now in service, with some slight improvements in several particulars. It is now the intention of the company to commence within a short time the construction of two more drawing-room cars, to be designed on the Mann plan, with the Mann oval-shaped roof, ventilating arrangement and light weight, and other features. The work will be pushed during the summer, and the cars will, it is expected, be ready for service early in the fall.

Bridge Notes.

The Louisville Bridge & Iron Co. has been awarded the contract for the new bridge over the Cumberland River at Nashville, Tenn. The company's bid amounted to $92,000. There were 16 bids in all, several being lower than the one accepted, but they did not come up to the specifications in all respects.

The Keystone Bridge Co. in Pittsburgh has been awarded the contract for the Iron train-house in connection with the new passenger station of the Concord Railroad in Concord, N. H. The work is to be completed as soon as possible.

Iron Notes.

The Lookout Rolling Mill at Chattanooga, Tenn., was sold March 5 under a deed of trust and was bought for $29,500, by A. M. Johnson and J. N. Hazlehurst, of Chattanooga. The amount received is sufficient to pay off the debts.

The Cartwright Iron Co., recently organized at Youngstown, O., with James Cartwright and others as incorporators, has bought the Alikanna Rolling Mill at Steubenville, O., and will put the mill in operation as soon as necessary repairs can be made.

Girard Furnace at Girard, O., went out of blast last week.

Joanna Furnace in Berks County, Pa., has gone out of blast for repairs.

The Colebrookdale Iron & Steel Co., recently organized, has purchased property near Pottstown, Pa., and will, it is said, build large steel works.

Messrs. Graff, Bennett & Co., and Jones & Laughlins are at work on an order for general iron for the Chicago, Milwaukee & St. Paul Railroad Co. The work is being done under the supervision of the Pittsburgh Testing Co.—*Pittsburgh American Manufacturer.*

Dilworth, Porter & Co. have started up their spike mill, at Pittsburgh, after a long suspension.

Manufacturing and Business Notes.

The H. W. Johns Manufacturing Co. has furnished boiler-covering made of asbestos for all the locomotives belonging to the Long Island Railroad. The Master Mechanic of the road says that the asbestos cement covering gives much less trouble than the ordinary wood lagging, and has the further advantage that a leak is readily detected, the steam and water going directly through the boiler covering and showing the exact spot where repairs are needed.

E. P. Allis & Co., of Milwaukee, are building an automatic engine with 40 by 40 in. cylinders to drive the finishing train in a rail mill. It is to make 110 revolutions per minute. They have also much other work on hand.

The Westinghouse Machine Co. in Pittsburgh is sending a good many engines to Europe—mostly to England and Holland. Among recent orders are a 15 horse-power automatic engine for the British Admiralty, and a 9½ by 9 in. engine, which will drive the electric lights in the South Kensington Museum, London. The latter engine is to run 550 revolutions per minute.

The Lake Shore Apprentices' School.

The Lake Shore Railway has always had the reputation of turning out good railroad men, as may be evidenced by the number who have secured lucrative positions on other roads through their connection with that company. The same principle applies to their workmen, and those who leave their trades at the company's shops are usually the brightest of mechanics. One of the reasons for this is the thorough training every apprentice of the company receives.

In order to better fit their apprentices for the practical work of life after they had served their time, the idea was conceived some eight years ago by Mr. Charles Paine, then General Superintendent, of establishing a school for drafting for the benefit of apprentices. So well has the idea worked that many people are anxious to have their boys learn their trades in the Lake Shore shops. In fact, it has become recognized as an honor to be selected as an apprentice. Many times, requests have been received from influential men for permission to allow their boys to be taught drafting in the school, but the request is invariably refused.

The school at the Buffalo shop is in charge of Mr. Matthew Scanlon, who graduated from it and who is now the draftsman of the shop here, besides having entire charge of the tools. His experience in the school taught him just what the scholars needed to learn, and the result is that, in order to explain the lessons thoroughly, models are used in addition to the blackboard drawings. The school is now attended by 16 apprentices from the blacksmith, tin, boiler and machine shops, who are obliged to attend the class for two hours on one night each week. A vacation of two months from the lessons is given them in July and August of each year.

As a rule when the boys first enter the school it seems dull and uninteresting for them, but the many advantages they are given in the way of study soon make them earnest attendants. The advantage of this instruction is that they can obtain both theoretical and practical educations at the same time. During all of the time Mr. Paine was connected with the road he offered a prize of a book on mechanics each year to the boy making the most progress in his class. Master-Mechanic J. S. Graham and Shop-Foreman Peter Fowler are both earnest friends of the school, taking great interest in its progress and furnishing it with all the facilities at their command. No apprentice is allowed to work in the shops unless he attends the drafting school, and a refusal to attend it results in his place being filled by another.

The Lake Shore is deserving of credit for their efforts for the advancement of the apprentices, and to none more so is this credit due than Mr. Charles Paine, who first conceived the idea.—*Buffalo Express.*

Interlocking Signals and Switches.

The interlocking switch and signal apparatus at Metropolitan Junction, Baltimore & Ohio Railroad, at Washington city, was finished so as to go into operation on March 3, operating the switches and home signals—the distant signals all remaining at danger—during the great rush of trains contingent on the inaugural ceremonies. The Baltimore & Ohio Railroad officials were greatly pleased with the results secured by the apparatus and also gratified that they were able to secure the completion of it in time. The erection of the work was begun on Feb. 16, under the personal supervision of Mr. Geo. W. Parsons, Superintendent of the switch and signal department of the Pennsylvania Steel Co., who remained on the ground during almost the entire time, assisted a portion of the time by Capt. A. G. Cummings, Engineer of interlocking appliances. The completion of so extensive a system is believed to be without parallel, in so short a time. The system embraces several novel features in interlocking, as the situation was one that presented many difficulties, and it had been claimed by other parties in this line of business, that this point could not be interlocked without having two signal towers, each with its own system of apparatus. The skill of Capt. Cummings enabled him successfullyto overcome all these difficulties, and his plan was so complete that it was effective for immediate use the moment the parts were in place, without any alteration or tinkering whatever.—*Steelton (Pa.) Reporter, March 7.*

Safety Valve Patents.

The following are extracts from the recent decision of the United States Supreme Court in the case of the Consolidated Safety Valve Co. against the Crosby Steam Gauge & Valve Co., containing the main points of the decision:

"In regard to all of the above patents adduced against Richardson's patent of 1866, it may be generally said that they never were, in their day, and before the date of that patent, or of Richardson's invention, known or recognized as producing any such result as his apparatus of that patent produces, as above defined. Likenesses in them, in physical structure, to the apparatus of Richardson, in important particulars, may be pointed out; but it is only as the anatomy of a corpse resembles that of the living being. The prior structures never effected the kind of result attained by Richardson's apparatus, because they lacked *the thing* [the Richardson stricture] which gave success. They did not have the retarding stricture which gave the lifting opportunity to the huddled steam, combined with the quick falling of the valve after relief had come. * * *

"What was needed was a narrow stricture to hold back the escaping steam, and secure its expansive force inside of the lip, and thus aid the direct pressure of the steam from the boiler, in lifting the valve against the increasing tension of the spring, with the result that, after only a small but a sufficient reduction in the boiler-pressure, the compressed spring would, by its very compression, obtain the mastery, and close the valve quickly. The problem was solved by Richardson, and never before. * * *

"In the Richardson valve, all the steam which escapes into the open air escapes from the huddling chamber, through *a stricture which is smaller than the aperture at the ground-joint.* * * *

"Richardson's invention brought to success what prior inventors had essayed and partly accomplished. He used some things which had been used before, but he added just that which was necessary to make the whole a practically valuable and economical apparatus."

Under this decision the Ashton Valve Co., of Boston, states that it is evident that the Richardson patent is the "*stricture which is smaller than the aperture at the ground-joint;*" that is to say, the area of inlet into the pop-chamber (which is the aperture at the ground-joint) is larger than the area of outlet from the pop-chamber.

This feature is shown in the Richardson patent, and is also essential in the Crosby valves, but has never been used by the Ashton Co. in its valves, in which the area of the outlet is much larger than the area of inlet, instead of smaller, as described in the Richardson patent. The Ashton valves, therefore, the company claims, do not infringe the Richardson patent.

The Richardson patent of 1866 expired Sept. 25, 1883, and the invention covered by it is now public property.

Electric Headlights.

It is stated that the officers of the Terre Haute & Indianapolis road (Vandalia Line) are much pleased with the electric headlight which has been in use experimentally on the road.

Master Mechanic Prescott says that as soon as practical he will endeavor to equip all their passenger engines which haul night express trains with the light. It has been in use on engine No. 45 two weeks, has never failed to work satisfactorily, and is less trouble to look after than the ordinary coal-oil head-light.

Brake Trials.

A special trial of the Laufman Screw-Brake was held in St. Paul, Minn., recently in the presence of a number of railroad men. The trial was a very successful one, stops being made at all rates of speed in a very much shorter time than with the ordinary chain-brake. It is understood that the Northern Pacific Co. intends to give the brake an extended practical trial by putting it on a number of its trains.

ANNUAL REPORTS.

The following is an index to the annual reports which have been reviewed in previous numbers of the current volume of the *Railroad Gazette:*

Atchison, Topeka & Santa Fe.

The following statement of the financial condition of the Atchison, Topeka & Santa Fe Railroad Co. and auxiliary lines is made up from official sources, and is as complete as can be furnished at the present time. The statement for the company and all its auxiliary lines is as follows:

Jan. 1, 1885, total mileage	2,798.80
Total capital stock	$56,913,250
Total outstanding bonds, all systems	50,857,500
Total stock and bonds	$107,770,750
Rate per mile:	
Capital stock	$20,335
Bonds	18,171
Stock and bonds	$38,506

The reduction of the bonded debt as compared with the statement of Oct. 1, 1884, has arisen through the operation of the various sinking funds and the purchase from sales of land, of land grant bonds and the sale of the Pleasant Hill & De Soto road, the bonded debt of which was $120,000.

The Atchison, Topeka & Santa Fe Railroad Co. operates and controls 2,798 miles of road between Kansas City and Atchison on the Missouri River to Guaymas on the Gulf of California, with numerous branches, some of which are large and important. It also owns a half interest in the Atlantic & Pacific Railroad, through which, under agreements with the Southern Pacific Railroad, it forms an independent

through line for freight and passenger traffic from the Missouri River to San Francisco.

The rapid increase of its business will appear from the following figures, which, from 1875 to 1881, inclusive, apply to its principal system, called the "Atchison system;" for 1882, 1883 and 1884 (December, 1884, estimated) the earnings of certain roads in Kansas operated as the Southern Kansas system, owned by the Atchison Co., are also included:

Year.	Miles.	Gross earnings.	Earnings per mile.	Net earnings.
1875	547	$1,520,358	$2,779	$821,608
1876	697	2,486,582	3,567	1,311,493
1877	738	7,279,104	3 628	1,356 241
1878	807	3 95 ,868	4,893	1 909,396
1879	997	6,381,443	6,401	3,454,968
1880	1,372	8.556,975	6,237	4,455,818
1881	1,695	12.584,500	7 423	4,789,000
1882	2,208	16,110,009	7,296	6 748,241
1883	2,2 9	15,909,441	7.169	8,256 525
1884	2,337	16,285,690	6,956	7,368,856

These figures are exclusive of the receipts from sales of land.

The expenses for 1884 include about $300,000 for wash-outs in New Mexico, and $220,000 for stone ballast, which in previous years was charged to construction. The cost of steel rails replacing iron and fastenings, $200,000, has also been included in the operating expenses.

The direct funded debt of the Atchison, Topeka & Santa Fe Co. and of the Southern Kansas system on Jan. 1, 1885, was $34,298,500; the capital stock was $56,913,250.

The dividends paid on the stock were 6 per cent. in 1883, 6 per cent. in 1884, and the same rate is being paid for the current year.

The income statement is as follows:

Net earnings for 1884		$7,368,856
Interest and sinking fund, A., T. & S. F.	$1,687,036	
" " " So. Kansas	469.775	
Interest on bonds paid as rental	861 930	
Sundries and special matters	175,000	
		3.193,771
Balance, surplus for stock		$4,175,085

From this surplus 6 per cent. dividends, $3,414,737, were paid, leaving $760,348 to be added to the accrued surplus of previous years, and increasing the surplus to $6,800,006.

Since the organization of the Land Department in 1871, the company has sold, less cancellations, 1,819,393 acres of land, and has received $7,727,587, part of which has been employed in reducing the funded debt.

The company still has 1,114,586 acres of land unsold, besides $1,567,583 in bills receivable for lands already sold, all of which are applicable to the redemption of the outstanding land grant bonds, amounting to $2,826,000, which are included in the foregoing statement of the Atchison Co. bonded debt; $100,000 of these bonds have been purchased and canceled since Jan. 1, 1885.

The foregoing does not include the operations of the Sonora road, which has yet not been taken into the Atchison accounts. The loss in operating the Sonora road in 1884 was about $33,000, against $93,500 in 1883. To this must be added the interest on the Sonora bonds, $283,500, making a total loss of about $316,500. It may be remembered that $5,000 of the $20,000 per mile of Sonora bonds were retained in the treasury to meet additional construction and deficiencies in operating expenses and interest. This amount has now been applied in full to the purpose named. There were no subsidy receipts in 1884, and the amount due from the Mexican government remains at the amount of 1883, $1,447,754. A resumption of subsidy payments is expected at the beginning of 1886.

Chicago, Milwaukee & St. Paul.

At the close of its last fiscal year, Dec. 31, 1884, this company operated 4,804 miles of road, an increase during the year of 44 miles, as shown below. The average mileage for the year was 4,780, as against 4,549 in 1883.

The equipment of this great system consists of 658 locomotives; 277 passenger, 45 sleeping, 8 parlor, 9 dining and 208 baggage, mail and express cars; 13,233 box and caboose, 2,350 stock, 4,074 flat and coal cars; 33 wrecking and tool cars. Additions since the last report are: 1 locomotive; 21 passenger, 5 sleeping, 2 parlor and 12 baggage cars; 1 box and 4 stock cars; 11 wrecking and tool cars.

The general account is as follows:

Liabilities:		
Capital stock, preferred	$16,540.983	
" " common	30,004.261	
		$47.445.244
Bonds outstanding		100,254,000
Bills payable	$1,304,374	
Unpaid vouchers and pay-rolls	1,610,661	
Miscellaneous accounts (current balances)	688,999	
Dividends and interest unclaimed	99,791	
		3.703,825
Income account		5,532,981
Total liabilities		$156,936,050
Assets:		
Cost of road and equipment		$149,426,734
Coal lands	2680,475	
St. Paul & Duluth stock and other investments	1,228,283	
Due from agents and other companies.	300,942	
Materials on hand	1,483,395	
Bills receivable	845,118	
		4,538,183
Cash on hand		2,971,133
Total assets		$156 936,050

Changes in bonded debt during the year were the redemption of $8,000 Iowa & Minnesota Division bonds, $387,000 second-mortgage and $40,000 land grants, and the issue of $387,000 new consols, $225,000 real estate bonds, $800,000 Chicago & Pacific Western Division and $3,000,000 terminal bonds; a net increase of $3,982,000 in the funded debt. There was no change in the stock. The cost of road and equipment increased $3,333,069 during the year.

The total fixed capital (stock and bonds) is $147,699,244, or at the rate of $30,745 per mile on the 4,804 miles of road.

The traffic for the year was:

Train miles:	1884.	1883.	Inc. or Dec.	P.c.
Passenger	5,827,235	5,360,173	I. 467,062	8.7
Freight and switching	13.393,275	13,700,262	D. 306,987	2.2
Service	1,158,481	1,389 496	D. 231,015	16.6
Total	20,378.991	20,449,931	D. 70 940	0 3
Pass. carried	4,904 678	4,591.232	I. 313,446	6.8
Passenger-miles	225.851,443	235,579.660	D. 9,728,217	4.1
Tons freight	6.023,016	5,661.667	I. 361,349	6.4
Ton-miles	1,247,737.233	1,176,605,032	I. 71,132.201	6.5
Av. rate:				
Per pass-mile	2.55 cts.	2.52 cts.	I. 0.03 ct.	1.2
Per ton-mile	1.29 "	1.39 "	D. 0.10 "	7.2

East-bound freight furnished 52 and west-bound 48 per cent. of the ton-miles. The average rate east was 1.25 and west 1.34 cents per ton-mile.

The earnings per train mile, passenger, were $0.99; freight, $1.20. The expenses per train mile, all trains, were $0.72. Locomotive service cost 23.3 and maintenance of way 11 cents per train mile.

The average rate per ton-mile received for freights for a series of years past has been as follows:

1865	4.11	1875	2.10
1866	3.76	1876	2.04
1867	3.94	1877	2.08
1868	3.49	1878	1.80
1869	3.10	1879	1.72
1870	2.82	1880	1.76
1871	2.54	1881	1.70
1872	2 43	1882	1 48
1873	2.50	1883	1.39
1874	2.38	1884	1.29

The average rate last year was thus only 31.4 per cent. of that received in 1865; it was very nearly one-half of that for 1871.

The earnings for the year were:

	1884.	1883.	Inc or Dec.	P.c.
Freight	$16,128 964	$16,365,354	D. $236.390	1.4
Passengers	5,766 843	5,927,668	D. 160,825	2.7
Mail, etc	1,575,191	1,366.802	I. 208,389	15 2
Total	$23,470,998	$23,659,824	D. $188,826	0.8
Expenses	13.859,628	13,778,038	I. 81,590	0.6
Net earnings	$9,611.370	$9,881,786	D. $270,416	2.7
Gross earn. per mile	4,910	5,201	D. 291	5.6
Net " " "	2,011	2,172	D. 161	7.4
Per cent. of exps	59.05	58.20	I. 0.85	....

Expenses include taxes, which were $702,060 last year and $614,609 in 1883.

Extraordinary expenses were: Equipment, $539,939; real estate, $265,092; buildings, bridges, etc., $652,601; total, $1,457,631.

The result of the year was as follows:

Net earnings, as above		$9,611,370
Income from other sources		82,306
Total		$9,693,676
Interest on bonds	$5.918,608	
October dividend, 3½ per cent. on all stocks	1,660,583	
		7,579,191
Surplus for the year		$2,114,485
Surplus, Jan. 1, 1884	$5.079,080	
April dividend, 3½ per cent	1,660,584	
		3,418,496
Total surplus, Dec. 31, 1884		$5,532,981

The President's report says: "At the date of the last report the company owned 4,760 miles of road. During the year 1884 there have been constructed 44 miles; 40 miles in completion of the Ottumwa line in Iowa; 3 miles from Fox Lake Junction to Fox Lake, and 1 mile on the line from Eau Claire to Chippewa Falls in Wisconsin; making the present mileage of the road 4,804 miles, all of which is owned by the company. No part of it is held upon leases on which rents are reserved, and the property is only incumbered by the bonded debt above mentioned. The company has never guaranteed the bonds or indebtedness of any other company, and has no contingent liabilities of any kind or description.

"The narrow-gauge road from Fond du Lac to Iron Ridge Junction, acquired late in 1883, has been widened to the standard gauge.

"Since the last report 269.18 miles of new steel rails have been laid, of which about 40 miles were laid on the new Cedar Rapids & Ottumwa line, and 229 miles in replacement of iron rails.

"The condition of the property has been fully maintained, and in many respects greatly improved.

"The great depression in commercial affairs during the past year has prevented the increase of earnings which was expected. The earnings during the year have, however, fallen short of the earnings of the year 1883 only $188,825. A return of general prosperity will bring largely increased earnings, and an increase may also be expected from the new lines of the company in Dakota, as a result of the natural improvement of the country tributary to those lines."

The report refers to the loss sustained by the company in the death of Mr. S. S. Merrill, so long its General Manager.

Texas & Pacific.

The following statements for the year ending Dec. 31 were presented at the recent annual meeting, making a brief and very unsatisfactory report for the year.

The mileage of road worked was the same (1,487 miles) as in the preceding year, no additions having been made.

The company, previously entirely under the control of the Missouri Pacific, has now a board of directors partly composed of bondholders, who made such representation a condition of their assent to a plan for funding coupons.

The general account is as follows:

Stock		$32,161,900
Funded debt		43,430.000
Texas school fund loan		165.965
Scrip of sundry issues		2,813,558
Interest due and accrued		916.360
Sundry items		13,725
Bills payable		1,043.572
Land Department		2,106,514
Total		$82,651,595
Road and equipment	$62,653,330	
Stock and bonds	8,968.302	
Land Department	2,384.428	
Interest scrip	4,709,540	
Sundry accounts	90.493	
Cash and accounts receivable	461.064	
Income account, balance	3,384,438	
		82,651,595

The funded debt includes $3,874,000 firsts and $9,316,000 consols, Eastern Division; $13,028,000 Rio Grande Division firsts; $6,720,000 New Orleans Pacific firsts; $8,861,000 income and land-grants; $6,000 old land grants; $1,624,000 general mortgage and terminal bonds. The last-named issue was made last year.

The item bills payable covers settlement with the Missouri Pacific for coupons cashed and advances made by it. The item of interest due and accrued includes $242,230 interest due and represents unpaid coupons not yet sent in, of which part are to be funded. The large item of land sales brought in on both sides of the account embraces the total amount of sales to date, but was not included in the balance sheet of 1883.

The earnings for the year were:

	1884.	1883.	Inc. or Dec.	P. c
Earnings	$5,918,756	$7,045,952	D. $1,126,896	16 0
Expenses	5,134,824	5,397.645	D. 262 821	5.0
Net earnings	783.932	$1,648,007	D. 864,075	52.4
Gross earn. per mile	3,989	4,738	D. 758	16.0
Net " "	527	1,108	D. 581	52.4
Per cent. of exps	86.8	76.6	I. 10.2	....

The income account for the year was as follows:

Net earnings		$783,932
Other income		129,124
Total receipts		$913,056
Interest on debt	$1,970,190	
Taxes and other charges	287,152	
		2,257,342
Deficit		$1,344,283

Of the full interest charge above of $1,970,190 in 1884, not all was paid, and $670,320 of the annual interest is now in process of funding under the plan which has been adopted. An important connection for this road eastward from Shreveport was completed during the year, and the track of the New Orleans Division has been improved, so that it is believed that the prospects for 1885 will be better if there are fair crops in Texas.

Housatonic.

This company owns a line from Bridgeport, Conn., to the Massachusetts line, 74 miles, with a branch from Brookfield Junction to Danbury, 5.5 miles. It leases the Berkshire road, from the state line to West Stockbridge, Mass., 22 miles; the West Stockbridge road, from West Stockbridge to the New York line, 2.75 miles, and the Stockbridge & Pittsfield road, from Vandeusenville to Pittsfield, Mass., 25 miles. The total is 79.5 miles owned, 46.75 miles leased and 126.25 miles worked. The report is for the year ending Sept. 30.

The equipment consists of 23 locomotives; 80 passenger and 16 baggage and smoking cars; 533 box, 14 hay, 329 flat and 2 caboose cars; 1 wrecking car.

The general account, condensed, is as follows:

Old stock		$20.000
Preferred stock		1,180,000
Funded debt		1,116,500
Accounts and balances		272,639
Profit and loss		208 933
Total		$3,507,572
Road and property	$3,122,099	
Rolling stock, cars	215,793	
Materials	54.527	
Accounts and balances	85,570	
Cash	119.583	
		$3,597,572

The funded debt includes $200,000 certificates issued for purchase of 400 cars; the earnings of these cars last year were $41,199 over all expenses and charges.

The traffic for the year was as follows:

Train-miles:	1883-84.	1882-83.	Inc. or Dec.	P. c.
Passenger	249.134	226,947	I. 22.187	9.8
Freight	283,417	286.953	D. 3,536	1.2
Other	25,443	29.464	D. 4 021	13.7
Total	557,994	543 364	I. 14,630	2.7
Passengers carried	267,080	255,577	I. 11,503	3.2
Passenger-miles	9,265,561	8.794,731	I. 476,830	5.3
Tons freight	290,808	323.063	D. 32.735	10.1
Ton miles	14.875,414	15,795,565	D.920,151	5.8
Av. train load:				
Passengers, No	37	28	D. 1	2.6
Freight, tons	52	55	D. 3	5.5

There was a considerable decrease in the freight and an increase in the passenger traffic.

The earnings for the year were as follows:

	1883 84.	1882-83.	Inc. or Dec.	P. c.
Freight and milk	$417,342	$470,583	D. $53,241	11.3
Passengers	230,230	236,321	D. 6,091	2.6
Mail, etc	29.188	28.589	I. 599	2.1
Total	$676,760	$735,493	D. $58,733	8.0
Expenses	472,503	483,241	D. 10.738	2.2
Net earnings	$204,257	$252,252	D. $47,995	19.0
Gross earnings per mile	5,360	5,826	D. 466	8.0
Net " "	1,618	1.998	D. 380	19.0
Per cent of expenses	69 8	65.7	I. 4 1	....

Expenses include the extra renewals and improvements noted below.

The income account is as follows:

Net earnings		$204 257
Rolling stock earnings		41.199
Total		$245,456
Interest and rentals	$138,340	
Taxes	41.174	
Dividends, 8 per cent. on preferred stock	94,400	
		$273.914
Deficit for the year		$28,458
Balance, Oct. 1, 1883		237.391
Surplus, Sept. 30, 1884		$208.933

Improvements during the year include 1,187 tons steel rails; a new iron bridge; a new passenger station; two passenger and two drawing-room cars, and land at several points, costing in all $96,500. The report says:

"The main line is now all laid with steel rail and thoroughly ballasted, and the equipment now believed to be second to none in the state, and while we do not look for an increase of business, we do hope and expect a reduction in the operating expenses, which will leave a fair net result."

Camden & Atlantic.

This company owns a line from Camden, N. J., to Atlantic City, 59.79 miles, with a branch to South Atlantic and Long Point, 7.71 miles. It operates the Philadelphia, Marlton & Medford, a branch from Haddonfield to Medford, 11.70 miles, making 79.20 miles worked. The following statements for the year ending Dec. 31 were submitted at the recent annual meeting.

The South Atlantic Branch was extended during the year to Long Point, 2 miles. Besides its railroad, the company owns and operates a ferry across the Delaware between Camden and Philadelphia, and a horse-car line in Atlantic City.

The passengers and freight carried were:

	1884.	1883.	Inc. or Dec.	P.c.
Passengers	1,064,458	848,442	I. 216,016	25.5
Tons freight	150,245	157,059	D. 6,814	4.3

Of the passengers carried 45,618 were on the South Atlantic Branch.

The earnings for the year were as follows:

	1884.	1883.	Inc. or Dec.	P.c.
Passengers	$372,303	$367,930	I. $4,373	1.2
Freight	135,954	144 995	D. 9.041	6.2
Mail, etc	48,437	45,946	I. 2,491	5.3
Total	$556,694	$558,871	D. $2.177	0.4
Expenses	471,056	392.067	I. 78,989	20.2
Net earnings	$85,638	$166 804	D. $81,166	48.6
Gross earn. per mile	7,119	7,239	D. 120	1.6
Net " "	1,095	2,161	D. 1.066	49.4
Per cent of exps	84.6	70.2	I. 14.4	....

The earnings and expenses of the ferries are both included in the statement.

The income account is as follows:

Net earnings, as above		$85,638
Interest and other income		18,761
Total		$104,399
Interest, etc		92,357
Surplus to profit and loss		$12,042

The cost of the accident at Pike's Peak on June 14 last, in which eight persons were killed and several injured, is placed at about $30,000, including damages paid and rolling stock replaced.

RAILROAD GAZETTE

Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

LIGHT RAILS.

A fact evident in the existing railroad system of this country, and indeed of the world, is that, taking it as a whole, distinctively light railroads do not prosper nor multiply. The apparent field for them is great—many times greater than for railroads of the ordinary type. The need for them is keenly felt in many regions, such as a correspondent describes in another column, where cheap light lines will satisfy this need, and apparently answer every requirement which the traffic justifies. Such lines can admittedly be built, and in many cases have been built, both of standard and narrow gauge, for but little more than the cost of a good turnpike; some of them even following the turnpike, using low speed, light rails, light rolling stock, sharp curves and little or no grading beyond a mere smoothing of the surface.

Yet out of the 125,000 miles of railroad in the United States, how much of it is now of this character, or anything closely resembling it? Absolutely, a large amount, no doubt; but comparatively there is very little, and that little shows a constant and strong tendency to approximate to the general standard. In spite of enormous differences in traffic there may still be said to be a certain average standard to which the vast majority of the roads approximately conform, or begin to do so almost as soon as the track is laid. Between the 12,000 to 14,000 miles of trunk lines or sections thereof, which make nearly half the earnings, and carry far more than half the traffic, of the country, and the 113,000 to 115,000 miles which manage to live on the rest of it, or on less than one-tenth as heavy an average traffic, there are indeed considerable differences of condition; yet the resemblances—in rails, in ties, in ballast, in rolling stock, in alignment—are still more striking, proving almost to demonstration that the law (to which there are, of course, exceptions) is that distinctively light railroads do not prosper, or if they prosper, do not stay light. We need not search far to find some strong reasons why this should be so, as respects rail sections at least.

Cutting down the rail section is almost the first point of attack for a certain large class of economists, much as cutting 10 per cent. off salaries is liable to be at a later period in the history of a railroad. There is probably no other way in which anything like as large a saving can be effected with so little demand upon the time or thought or skill of the manager; nor does it admit of doubt that either or both of these economies may at times be both expedient and necessary. Nevertheless, without denying that the purchase of light sections may often be wise, they would not, we may be certain, be purchased nearly so often as they are if the full extent of the sacrifice made were realized. That it is not more fully realized is probably due in the main to a not unnatural impression that in buying rails what one wants is *steel*: That if light and heavy sections are the same price per ton, buying a 30 lbs. section instead of a 60 lbs. is like a poor and hungry man buying a one-pound loaf at five cents, instead of a two-pound loaf at ten cents.

This is not at all the case. In buying rails we are not buying steel; at least we do not care to buy it. We are buying three imponderable qualities, (1) *stiffness*, (2) *strength*, (3) *durability*. If we get our money's worth of these qualities, it is a matter of complete indifference (except the future scrap value of the steel, which a poor, light-traffic railroad can't afford to give much thought to) whether we get much or little of steel. If we do not get our money's worth of *what we want*, our bargain is just as bad, however much steel we get.

To determine whether we do or not, one must, unfortunately, use an intelligence somewhat higher than that of a hay-scale. Any absolute measure of the qualities mentioned is especially difficult. Thus, to estimate exactly our stiffness and strength we must determine the position in the rail-section, fig. 1, of two little points which lie at a distance called the *radius of gyration* from the centre of the rail (meaning simply the points where, if all the steel in base and head were concentrated, it would have the same power to *resist* gyration, *i. e.*, bending, as it now has), and we must then make a number of other assumptions in regard to the character of the load and support which we well know are not only doubtful but will not be even approximately true in practice, unless by accident.


Fig. 1.

But for comparative purposes all this is unnecessary. The support given to the rail from below by the roadbed and ties may be assumed the same for any section of rail, whatever it may be absolutely. We may assume that any two or more sections requiring to be compared will be practically what geometers call "similar" to each other, *i. e.*, with the same proportion of base to height, etc., etc., so that fig. 1 may, by simply varying the scale, be taken to represent a section of any weight from 10 to 100 lbs. per yard, and yet be tolerably well designed even for these extremes. From established mathematical laws we also know that the weight will, under these assumptions, vary as *breadth* × *height*, and that the stiffness will vary as *breadth* × *cube of height*. That is to say, if we multiply every dimension by two, we increase the weight of the section by $2 \times 2 = 4$, but the stiffness by 2×2^3 or $2 \times 8 = 16$ or 2^4, in other words the stiffness in that case varies as the *fourth power* of the increase in linear dimensions, whereas the weight varies only as the *square*.

An algebraic demonstration of the simplest character would prove this result to be in accordance with a general law; that the *stiffness in a rail varies as the square of its weight per yard;* if we increase the weight

10 per cent.	20 per cent.	30 per cent.
we shall increase the stiffness to		
$1.10^2 = 1.21$	$1.20^2 = 1.44$	$1.30^2 = 1.69$
or 21 per cent.	or 44 per cent.	or 69 per cent.

All this has a hazy, indefinite sound, which does not produce much impression on the mind; but let us reduce it in the accompanying Table I. to the plain, practical basis of *how much stiffness we get for a dollar* with light and heavy rails, and we shall have some inkling of the reasons why light rails are, sooner or later, avoided as the plague by all railroads; admitting, as we must, that for light lines especially stiffness is much the most important quality a rail can have, and (as we shall see more fully) by much the cheapest stability to be had in the market; far cheaper than tamping-bar stability, which roads of heavier traffic can afford to rely on more extensively. In Table I. a 50 lbs. rail is taken as the unit of comparison, as being about the maximum for distinctively light railroads and the minimum for those of ordinary type: and the cost of rails is taken at the even figure of $30 per ton.

TABLE I.

Comparative Amount and Cost of Stiffness in Light and Heavy Rails.

Wt. of rails. Lbs. p. yd.	Tons per mile.	Cost per mile at $30 per ton.	Comparative stiffness.	Cost per unit of stiffness.	Comparative value rec'd for $1.
10	16	$480	.04	$12,000	20 cts.
15	24	720	.09	8,000	30 cts.
20	32	960	.16	6,000	40 cts.
25	40	1,200	.25	4,800	50 cts.
30	48	1,440	.36	4,000	60 cts.
35	56	1,680	.49	3,429	70 cts.
40	64	1,920	.64	3,000	80 cts.
45	72	2,160	.81	2,667	90 cts.
50	**80**	**2,400**	**1.00**	**2,400**	**$1.00**
55	88	2,640	1.21	2,182	1.10
60	96	2,880	1.44	2,000	1.20
65	104	3,120	1.69	1,846	1.30
70	112	3,360	1.96	1,714	1.40
75	120	3,600	2.25	1,600	1.50
80	128	3,840	2.56	1,500	1.60

Tons of rail per mile taken at 1.6 tons per lb. per yard, allowing a certain minimum of side-track. Main track only requires 11-7 or 1.571 tons per pound per yard.

Comparative stiffness (4th col.) is as the square of the weight per yd., 50 lbs. being taken as the limit of comparison. *Cost per unit of stiffness* (5th column) is given by dividing column 3 by column 4. *Comparative value received for* $1 (last column) is given by dividing column 5 by $2,400.

It will be seen from Table I. that the lighter the original section of a railroad, the more it loses by using a light section, because the more would be its proportionate gain from a given increase in weight of section. The sacrifice of value in buying light sections is precisely the same as if in buying rails we were, in fact as well as in form, buying *steel* instead of *stiffness*, and were to choose light sections in spite of the following market quotations:

	Per ton.
Steel in 20 lb. sections	$75.00
" 30 "	50.00
" 40 "	37.50
" 50 "	30.00
" 60 "	25.00
" 70 "	21.43
" 80 "	18.75

Or again, our loss is the same as if we were offered a certain amount of steel in 25 lbs. sections at $30 per ton, but were told that if we would take twice as many tons *in the form of 50 lbs. sections* we could have the remainder at $10 per ton. That is precisely what we are told in effect, as respects the quality we are really buying—stiffness—when we are offered rails of such sections at a uniform price per ton.

The ultimate strength of rails is a less important quality than the stiffness, because it is never expected to be called fully into use. Nevertheless, it often is so called into use and even exceeded, and it is therefore an important quality. The strength is less affected by the weight of the rail than the stiffness; for, referring to fig. 1 once more, the strength varies only as the *square* of the height, whereas the stiffness varies as the *cube*, both varying directly as the width. Therefore, in a similar way to that employed for determining stiffness, we may determine that the strength varies as the *square root of the cube* (or $\frac{3}{2}$ power) *of the weight*, and obtain Table II.:

TABLE II.

Comparative Amount and Cost of Strength in Light and Heavy Rails.

Wt. of rails. Lbs. p. yd.	Cost per mile at $30 p. ton.	Comparative strength.	Cost per unit of strength.	Comparative value rec'd for $1.
10	$480	.089	$5.365	44.7 cts.
15	720	.164	4.380	54.8 "
20	960	.253	3.796	63.2 "
25	1,200	.354	3.717	70.7 "
30	1,440	.465	3.091	77.6 "
35	1.680	.586	2,870	83.6 "
40	1,920	.716	2,684	89.4 "
45	2,160	.854	2,530	94.8 "
50	**2,400**	**1.000**	**2,400**	**100.0** "
55	2,640	1.154	2,288	104.9 "
60	2,880	1.314	2,191	109.5 "
65	3,120	1.482	2,105	114.0 "
70	3,360	1.656	2,028	118 3 "
75	3,600	1.838	1.959	122.5 "
80	3,840	2.024	1,897	126.5 "

The different columns are determined in substantially the same manner as in Table I., except that the third column is as the $\frac{3}{2}$ *power* of the weight per yard, taking 50-lbs. rails as the unit of comparison.

The loss of strength obtained with light sections will be seen from Table II. to be far less striking than the loss of stiffness. Nevertheless, it is as if strength were a ponderable element and we bought it in spite of the following prices per ton:

Rails of 20 lbs. section	$47.50 per ton.
" 30 " "	38.60 "
" 40 " "	32.30 "
" 50 " "	30.00 "
" 60 " "	27.40 "
" 70 " "	25.30 "
" 80 " "	23.70 "

If steel were quoted at these prices per ton, it is a tolerably safe hypothesis that light rail sections would not be in much favor: yet this is an unduly favorable showing even for the item of strength, for if we were to compute the comparative strength after the sections have received a certain fixed amount of wear, we should find the apparent disadvantage of light sections as given above very much increased.

It is a little difficult to determine a standard by which to measure durability, because as a rule light and heavy sections are chosen for very different duties, *i. e.*, are approximately proportioned, and necessarily must be, to the kind of locomotives running over them, so that no rational comparison can be made between the durability in a 10 or 20 lbs. section and that in a 70 or 80 lbs. section, as there can be in the items of stiffness and strength. What we can do, however, is to compare each section with one 5 or 10 lbs. heavier, since there is a rational and practical choice between such sections for any one given service.

Taking a rude yet tolerably approximate average of rails as they are now designed and chosen, we may say (1) that half the total weight is in the head, and (2) that half or nearly half of the metal in the head (or $\frac{1}{4}$ of the whole weight of the rail) is expected to be worn away before the rail is finally condemned as unsafe, although it may be earlier removed to a less trying location. That is to say, a 40 lbs. rail has 10 lbs. of wear in it, and a 50 lbs., 12½ lbs., making their weight when finally condemned 30 and 37½ lbs. respectively.

When comparing two rails *for any one given service*

TABLE III.

Comparative Amount and Cost of Durability in Light and Heavy Rails.

Weight in lbs. per yard.	Weight in head only.	Available for wear. Max'mum. (½ head).	Available for wear. Minimum. (1-5 head).	Left in head after min. wear.	Spare metal in next heaviest rail before head becomes as light.	Times increase of wear by adding 5 lbs. to section.	Increase of weight by adding 5 lbs. to section.	Comparative cost of the durability in 5 lbs. more per yd., taking the durability of a lighter section as worth 100 cents on the dollar.
10	5.	2.5	1.	4.	3.5	3.50	½	½ or 14 cts. on the dollar.
15	7.5	3.75	1.5	6.	4.	2.67	⅓	⅓ " 12½ " "
20	10.	5.	2.	8.	4.5	2.25	¼	¼ " 11 " "
25	12.5	6.25	2.5	10.	5.	2.	⅕	⅕ " 10 " "
30	15.	7.5	3.	12.	5.5	1.83	1/6	1/6 " 9 " "
35	17.5	8.75	3.5	14.	6.	1.71	⅐	⅐ " 8½ " "
40	20.	10.	4.	16.	6.5	1.625	⅛	⅛ " 7¾ " "
45	22.5	11.25	4.5	18.	7.	1.55	1/9	1/9 " 7 " "
50	**25.**	**12.5**	**5.**	**20.**	**7.5**	**1.5**	1/10	1/10 " 6⅔ " "
55	27.5	13.75	5.5	22.	8.	1.454	1/11	1/11 " 6¼ " "
60	30.	15.	6.	24.	8.5	1.42	1/12	1/12 " 5⅞ " "
65	32.5	16.25	6.5	26.	9.	1.385	1/13	1/13 " 5½ " "
70	35.	17.5	7.	28.	9.5	1.357	1/14	1/14 " 5¼ " "
75	37.5	18.75	7.5	30.	10.	1.333	1/15	1/20 " 5 " "
80	40.	20.	8.	32.	10.5	1.312	1/16	1/21 " 4¾ " "

The manner of determining these various values is as follows :

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Half of Col. 1.	Half of Col. 2; ¼ of Col. 1.	1-5 of Col. 2; 1-10 of Col. 1.	Col. 2 — Col. 4.	Col. 5 — No. in line below of Col 2.	Col. 6 ÷ Col. 4.	Five lbs. ÷ original wt. in Col. 1.	Col. 8 ÷ Col. 7.	$1.00 × Col. 9.

however, it is obvious that this is an unfair basis of comparison, since whatever the original weight per yard, a rail for any one given service may be so designed as to utilize most of any additional weight *in wear*, leaving the weights of the worn-out rails when scrap nearly the same. This is, of course, not fully possible without using very ugly and distorted original sections, but it is at least a moderate statement that, even if any two rails of different weights are designed precisely "similar" to each other (as say fig. 1), so that they have the same proportion of waste metal (as respects wear) in the base, yet the *head* can in all cases, in any one given service, be worn down to an equal ultimate weight before condemnation, so that a 40 lbs. and 50 lbs. rail would compare as follows :

	When new. Head.	When new. Base.	When worn out — Head.	When worn out — Base.	When worn out — Total.
40 lbs. rail	20 lbs.	20 lbs.	10 lbs.	20 lbs.	30 lbs.
50 lbs. rail	25 lbs.	25 lbs.	10 lbs.	25 lbs.	35 lbs.

A 50 lbs. rail worn down to 35 lbs. may fairly be said to be at least as strong and safe as a 40 lbs. rail worn down to 30 lbs., although that is rather an extreme illustration as respects the absolute amount of wear for either of the rails specified. It is, however, by proper design realizable in sections sufficiently strong for their duty.

If, however, we are practicing the last degree of economy in first cost, choosing the very lightest section which is consistent with the duty laid upon it, as our correspondent in another column proposes, and as we may admit at once is sometimes expedient, it is obvious that we cannot count on any such rate of wear as that. Wearing off half the head means reducing its ultimate strength by something like 45 per cent., and its stiffness by 65 to 70 per cent. (making merely a rough estimate of the new "moments of inertia" and "radius of gyration" necessary to determine it exactly). When we are selecting a rail as light as we dare, we have no such margin as that; yet we must assume some margin for wear, for however light a section may be, it cannot be expected to become unserviceable as soon as the top is fairly polished. We may assume perhaps that, in such cases, a wear equal to *one-fifth* of the metal in the head is more or less consciously contemplated and actually realized. With these premises we may determine in Table III. how much durability we get for a dollar with light and heavy sections, and it will be seen that—of all the three qualities we are buying—the worst sacrifice by far is in buying durability in light sections. It is as if when buying rails we were buying steel instead of durability and chose the light sections in the face of the following market quotations of steel :

Steel in 20 lb. sections	$30.00 per ton
Additional lots (spot cash for future delivery, as needed, at end of — years)	2.75 " "
Steel in 40 lb. sections	30.00 " "
Additional lots	2.31 " "
Steel in 60 lb. sections	30.00 " "
Additional lots	1.76 " "

Of course this enormous difference is due not so much to the extraordinary cheapness of the durability in the heavier sections as to the extraordinary dearness of the durability in the lighter sections. Still if we assume that we get our money's worth out of the light sections, the comparison is a fair one. By varying the assumed rates of wear the numerical comparison will be modified accordingly, but in no probable case enough to make the moral materially different.

Of course, too, it is to be remembered that durability is a quality for *future* delivery (for light traffic roads, perhaps, in a very distant future), which we pay down for now in cash. It is therefore only the present worth of this future value which we ought to consider. Still, this applies *only* to the durability. The strength and stiffness we have use for from the very day the rails are laid, and even the present worth of the extra durability, at the largest probable rate of interest and the longest probable life of light rails, is cheap indeed at the price paid for it, as will appear from the following Table IV., which explains itself. The computation is a little complicated, since it involves taking the logarithm of a logarithm, but the result is simple enough to make it clear to any one that whether a new railroad project, *as a whole*, will pay or not, it is almost sure to return a heavy profit on capital invested, obtained at any probable cost, to buy reasonably heavy rail sections for their durability alone.

TABLE IV.

*Years of Wear which a Light Rail Section Must Outlast Before the Durability Obtainable by Adding 5 lbs. per yard to it will Become a Losing Bargain, Costing More than that of the Light Section.**

Weight of Light Section lbs. per yard.	Present Cost of Capital. 5 per ct	10 per ct.	15 per ct.	20 per ct.
	Years.	Years.	Years.	Years.
20	45.0	23.0	15.7	12.0
30	49.1	25.2	17.2	13.1
40	52.0	26.6	18.1	13.9
50	55.5	28.4	19.4	14.8
60	58.1	29.7	20.6	15.5
70	60.3	30.9	21.1	16.1
80	62.4	31.9	21 8	16.7

* For the ultimate value, U, of a certain sum p invested at compound interest for n years at r per cent., we have

$$U = p(1+r)^n$$

$$\text{whence, log. } U = \log. p + \log. (1+r) \times n$$

$$\text{and } n = \frac{\log. U - \log. p}{\log. (1+r)}$$

Letting the numerator (1) of the vulgar fractions in col. 9 = p (the log. of which is 0 and may be dropped), the denominator of the same fractions will = U, and we have:

$$\log. n = \log. \text{ of } \log. U - \log. \text{ of } \log. (1+r)$$

In these facts we have reasons enough and to spare why all roads should tend, as they do tend, to use what projectors of new roads call a "heavy" rail, and think they can't afford. It is because, for a poor road as well as a rich one, *the best is the cheapest*, and a poor road even more than a rich one must have the cheapest to live at all. It is because, with railroads as with men, "the destruction of the poor is their poverty," in that there are not as many cents in a poor man's dollar as in a rich one's, because of the bad bargains which his poverty drives him to—or he thinks it does. Let us by all means buy the light sections if we must have something and cannot pay more, but let us at least realize how great a sacrifice we are making, and make sure that there is no other direction in which a less costly economy can be exercised.

Of course, as has been already stated, there is another side to this question, a certain legitimate and advisable use of light rails. If a man needs but three yards of cloth to make a coat, and only needs but one coat, there is no particular economy in his buying four yards, simply because he can get it cheap, and then, besides, there is always the open question whether his greatest need is for a coat or a pair of breeches. That part of the question we must postpone to another article. We have merely stated here that if a man is going to buy a coat, there is a fearful loss which a poor man can't afford in buying one which is too small to fit and too flimsy to wear.

LUMBER PRODUCTION AND LAKE SUPERIOR TRAFFIC.

The *Northwestern Lumberman* has collected elaborate statistics of the production of white pine lumber in the Northwest, giving the output of nearly every mill last year. The total production for 12 years is given as follows, in *thousands* of feet :

Year.	M. ft.	Year.	M. ft.
1873	3,993,780	1879	4,806,943
1874	3,751,306	1880	5,651,295
1875	3,968,553	1881	6,768,857
1876	3,879,046	1882	7,552,151
1877	3,595,333	1883	7,624,790
1878	3,629,473	1884	7,935,033

It appears from this that the production last year was 4½ per cent. more than the year before, though the increase was but 1 per cent. from 1882 to 1883, and prices and prospects last year were less favorable than for several previous years. But it is not by any means certain that there was an increase of consumption. Probably there was a decrease. The *Lumberman* has collected statistics of the stocks on hand *at the mills*, showing a total of no less than 3,516,957 thousand feet at the end of the year, which is 43½ per cent. of the production. In some of the lumber districts but a comparatively small part of the year's production was marketed. The mills on the St. Paul & Omaha road have 71 per cent. of their year's cut on hand; those on the Wisconsin Central, 68 per cent.; and those in the Duluth lumber district, 63 per cent.

The increase in production over 1883 seems to have been almost wholly in Northwestern Wisconsin, Lake Superior points and Minnesota. The production on Lake Michigan and Green Bay decreased somewhat. At interior and railroad mills in Michigan there was a decrease from 884 to 783 million feet, equal to 11¾ per cent. In the Saginaw Valley there was a small increase (1¾ per cent.), and on the Lake Huron shore a much smaller increase (¾ per cent.).

The greatest gains were 27¾ per cent. in the Duluth district, 20 per cent. on the St. Croix River, and 25 per cent. on the Mackinaw line of the Michigan Central Railroad.

The development of production of late years has been largely by interior mills which can ship only by railroad; but when prices are low, as last year, the railroad mills in Michigan appear to be at a disadvantage, as their production decreases more than that of mills on the lakes, and naturally more than that of the West Wisconsin and Minnesota mills, which are nearest the new Western markets.

The lumber production began to grow after 1878, having been stationary for six years. The production of the mills on the several Michigan lumber railroads during the period of growth has been in *millions* of feet :

Year.	C. & W. Mich.	G. R. & Ind.	D. L. & N.	F. & P. M.	Mich. C.
1878	65 0	128.5	99.5	59.6	93.5
1879	87.8	146.5	92.7	80.6	95.6
1880	58.4	174.8	71.5	92.7	68 3
1881	109.2	267.9	114.2	130.9	84.2
1882	206.9	329.6	102.7	112.6	72.6
1883	196.6	366.4	129.7	110.0	76.3
1884	100 6	313.0	120.1	107.5	95.3

The aggregates of these five railroads were :

1878.	1879.	1880.	1881.	1882.	1883.	1884.
446.1	503.2	465.7	706.4	824.6	819.5	736.4

Thus they increased 58 per cent. from 1878 to 1882, and have decreased 10¾ per cent. since. They have not all progressed alike, however. On the Chicago & West Michigan the production was more than trebled from 1878 to 1882, and it has fallen off more than one-half since, and 49 per cent. since 1883, which will account for the large decrease in this road's earnings. The Grand Rapids & Indiana mills increased their production 156 per cent. from 1878 to 1882, and the decrease since has been but 5 per cent. More lumber is produced on this road than on any two of the others. The production on the Detroit, Lansing & Northern has varied much less, increasing 30 per cent. from 1878 to 1883, when it reached its maximum, and decreasing 7 per cent. last year. On the Flint & Pere Marquette there was an increase of 120 per cent. from 1878 to 1881, and a decrease of 18 per cent. since. On the Mackinaw line of the Michigan Central the production *decreased* after 1878 and 1879, and last year it *increased* again.

The course of the production on the Northern Wisconsin railroads cannot be traced so well, because the statistics for each one separately have not been kept so long, and some were recently opened. For such years as have been reported the production has been, in *millions* of feet :

	1880.	1881.	1882.	1883.	1884.
St. Paul & Omaha	...	....	197.0	276.5	288.1
Wis. Valley	141.9	180.5	236.2	254.6	271.7
Wis. Cen	142.2	182.5	142.2	282.0	302 0
Mil., L. S. & W.	...	....	....	. ..	99.2

The three roads first named had a nearly equal lumber production last year. The Wisconsin Valley is a branch of the Milwaukee & St. Paul, only 107 miles long, which is much less than the mileage in lumber

country of any of the other three roads. Since 1882 the increase has been 46 per cent. on the St. Paul & Omaha, 15 per cent. on the Wisconsin Valley, and 111 per cent. on the Wisconsin Central.

It was during this time that the production decreased on the Michigan railroads. In Wisconsin, however, all the roads but the Wisconsin Valley have been increasing their mileage, some of them largely, and all are much newer roads than the Michigan lines, and penetrate forests which had been hardly touched:

How important an element of traffic the lumber production is may be judged by the fact that last year's production of lumber and shingles weighed about 12,524,000 tons, which is equal to about three-eighths of the anthracite coal production, and is a third more than the total movement of east-bound through freight over all the trunk lines. And most of this lumber is carried by rail, and much of it long distances.

The exceptions are the consumption of the lake cities, which is a very large exception, as Chicago alone is estimated to use 500 million feet yearly; part of the consumption of towns on the Mississippi River, and part of the consumption of places reached by the Erie Canal, including New York city. But the chief exception is the consumption of the lake cities. A great deal is rafted down the Mississippi and sawed at river towns; but most of this goes west by rail.

The increase in production in the lumber districts northwest of Chicago, which send their product directly west and southwest, and not by any lake market, is the great feature of this traffic. Since 1878 this western district has increased its production 2,424 millions of feet (237 per cent.), while the district that markets chiefly by way of Chicago or other Lake Michigan ports has increased its production by only 976 million feet (78 per cent.); and even this latter increase has been very largely in districts which can, and to a considerable extent now do, ship direct to the West without sending to Chicago. This, however, is due as much to the opening of new markets as to the extension of production further west; as Northwestern Minnesota and Dakota naturally will go to West Wisconsin rather than to Chicago for their lumber.

The *proportion* of the lumber production distributed at Chicago has decreased, therefore, and seems likely to decrease still more; and it is quite possible that this great growth of a lumber movement from Northwestern Wisconsin to to the West and Southwest will have a reflex influence on the movement of grain from the West and Southwest to Lake Superior ports. For the railroads the disadvantage of the lumber traffic from Wisconsin has been the lack of back loads, especially for cars going southwest. To carry grain from Nebraska or Kansas to Chicago and then send the cars northwest three or four hundred miles into Wisconsin for lumber to go back to the Southwest, causes a very wasteful car movement. One result has been that the rail rates on lumber from Chicago have been kept materially less than from Eau Claire, etc., for even shorter distances. Something must pay for hauling the empty car from Nebraska to Eau Claire, or from Chicago to Eau Claire, and there has been nothing but the lumber to pay for it. But the lumber is there northwest of Chicago, and if it is required in the Southwest the cars must go that way, and there will be a strong temptation to accept any rates which will give them back loads. The lumber regions themselves can take but little Southwestern produce but they are for the most part within 150 miles or less of Lake Superior ports. Now, if the railroads will make a rate on grain so low that it can be sent east from the Southwest by way of a Lake Superior port as cheaply as by way of Chicago, they can get back loads for their cars loaded with lumber at Wisconsin mills. All of them, however, have lines to Chicago, and if they carry grain to Lake Superior they will lose the transportation of it to Chicago. The question with them is, whether the profit on the two hauls at the rates necessary to permit shipments by Lake Superior will be greater than on the business as now conducted, which involves long hauls of empty cars. In any event they must modify their action to meet the competition of those railroads which have no line to the West Wisconsin lumber districts, (as the Chicago, Burlington & Quincy) and consequently must get their back loads of lumber at Chicago. It will not be possible to make rates to and from Lake Superior which will exclude lumber shipments from Chicago, because these other roads are bound to have back loads, and will make whatever rates are necessary to secure them.

This is to a great extent a new problem. The lumber shipments from West Wisconsin to the Southwest have very recently become important, because for some time the rapid growth of Minnesota, Dakota and Manitoba required the chief part of the Wisconsin production; and the carrying of grain from the Southwest to Lake Superior has but just become possible, because through lines have but just been opened to the lake. Should the country directly west and northwest of St. Paul again grow very rapidly and require nearly all the West Wisconsin production, then there would be no inducement to carry grain from the Southwest to Lake Superior. That does not appear probable, however, because the proportion of the lumber produced as far north as St. Paul has become very large and increases, and is a much larger proportion of the total production than the lumber consumption of the country west of St. Paul is ever likely to be of the total consumption.

The beginning of such a movement is involved in difficulties and complications. Until last year the shipments of grain by Lake Superior ports were insignificant, even from the country directly west of Duluth and more than 400 miles nearer to that port than to Chicago, which is equally distant by lake from Buffalo. Last year, however, there were really large receipts of grain at Duluth. Moreover, last year there were large shipments of flour from the Minneapolis mills by way of Lake Superior ports, much going by Washburn, near Bayfield, on a new line of the St. Paul & Omaha road. These shipments demoralized rates. If vessels will carry from Lake Superior ports as cheaply as from Chicago, they cannot fail to demoralize rates. If, permanently, lake rates from Duluth or Superior to Buffalo become as low as from Chicago to Buffalo, they will tend to force the railroads from Chicago northwestward to accept through rates per ton per mile as low as those from Chicago to New York, which are not much more than half the present rates of the Northwestern roads. This would be a serious calamity for them, and we may be sure that they will avoid it if possible. Actually, we believe, the rates from Duluth by lake are much higher than those from Chicago, but a large traffic may cause them to be reduced. Lake Superior, however, is bound to affect rail rates from all its ports and places near them to some extent, as Lake Michigan has affected rates not only to Chicago, but as far west and south as St. Louis.

Chicago Through Shipments Eastward.

Chicago through shipments eastward of all freights, except live stock and dressed beef, including this year and last the shipments of junction points between Chicago railroads and the Eastern railroads, have been in the month of February for the last seven years, in tons:

1879.	1880.	1881.	1882.	1883.	1884.	1885.
198,541	169,181	207,790	225,815	234,232	195,789	259,371

Thus the shipments this year were 63,582 tons, or 32½ per cent., more than last year, when the same shipments were included. In previous years the shipments at junction points were not included, but those of fresh beef were. The dressed beef shipments in the year 1884 amountedto 70,112 tons, but they were much smaller amounts in previous years, and before 1881 were insignificant. On the other hand the shipments of junction points are said to have been about 9 per cent. of the Chicago shipments, so that they would have brought up the shipments of 1883 to 255,000 tons, of which perhaps 5,000 tons was dressed beef, so that after making all allowances for the junction points the February shipments this year remain much larger than in any other, in spite of the snow blockades, which doubtless did reduce them materially.

The rates on the shipments were irregular, both this year and last, but probably somewhat higher last year, when the regular rate was 30 cents per 100 lbs. for grain and flour to Chicago, against 25 cents this year. *At the regular rates*, the traffic, if all had gone to New York, would have yielded, according to a graphical statistical statement recently made by H. C. Blye, General Agent in the office of the Joint Executive Committee, which we have extended to cover last February:

Year.	Earnings. Gross.	Net.	Year.	Earnings. Gross	Net.
1880	$1,496,389	$964,266	1883	$1,526,764	$824,072
1881	1,604,019	953,745	1884	1,301,596	760,810
1882	1,119,045	416,220	1885	1,478,415	682,146

Actually an enormous discount must be made in 1882, 1884 and 1885 for reductions from the regular rates, which probably was enough to prevent any net earnings whatever from the business in 1882, and reduced both gross and net as much as a dollar a ton last year, and as much as 50 cents per ton this year, which would make the net earnings in February $505,021 last year and $552,460 this year.

The expenses here are calculated on the basis adopted by the railroads for paying for traffic in excess of allotted percentages. If the rates had been maintained, it will be seen the gross earnings this year would have been less than in any other of the six except 1882 and 1884, and the net less than in any except 1882, though the shipments were larger than ever before, and this without considering the shipments of junction points previous to 1884. When the cuts in rates are considered the same remains true, except that last year the net earnings probably were slightly less than this year. When the number of roads sharing the business is considered, the decrease in the profits of each of the old roads from those obtained in 1880, 1881 and 1883 is very great. In the case of the Michigan Central, which has suffered most, even at full rates it would have received but $45 of profit this year for every $100 in 1880.

The earnings here are calculated by the rates of each class, and the shipments of classes above grain and provisions are now so large, and the rates on them so much higher than the grain rates, that they make a material difference in the *net* earnings. In 1884 these other shipments amounted to one eighth of the whole. Mr. Blye's diagrams and tables show the average rate in December last to have been 28¼ cents per 100 lbs., the grain and flour rate being 25 and the provision rate 30. As the provision shipments are only about one fourth of the grain shipments, they would make the average only about 26 cents, and the average is brought up by freights which yield still higher rates, from 35 to 100 cents.

For the two months ending with February the Chicago shipments have been, in tons:

Year.	January.	February.	Two months.
1879	192,512	138,541	332,053
1880	165,494	169,181	334 675
1881	267,646	207,790	475 436
1882	321,148	225 8 5	546,963
1883	271,162	234,232	505,394
1884	234,704	195,789	430.493
1885	322,073	259,371	581.444

Here again we must allow for the shipments of junction points previous to 1884, which probably made the shipments of 1882 a little greater than this year, while those of all other years were less. The gain over last year is 35 per cent. Compared with last year the average daily shipments (including Sundays) were:

	1885.	1884.	Increase.	P c.
January	10 389	7,571	2,818	37.2
February	9 263	6,751	2,512	37.2
Two months	9,855	7,175	2,6e0	37 4

It seems, then, that in spite of the snow the shipments were not one-ninth less *per day* in February than in January this year, and that there was a similar decrease last year, without the same cause.

The immediate prospects from Chicago business now are not brilliant. The open rate now is 20 cents for grain, and probably this is as much as has been obtained since February, except for some shipments to interior points. Some profit can be made on this, but not much, and so far the shipments have not been very large. The railroads will want to carry as much as possible before navigation opens, and there is nothing to prevent their cutting rates as they did last year, except that they all seem heartily sick of doing business without any profit, and compete but languidly even at current rates. There is reason to believe that east-bound rates might be restored now, even without the coöperation of the West Shore and the Lackawanna, which, however, can have a good deal of effect on grain rates after the lakes open, however, the other railroads may agree. But it seems to be thought best by some that the whole through business should remain very bad until rates can be restored on the whole of it, passengers and freight, in both directions, and for this the coöperation of the West Shore is required. Its coöperation can probably be had at any hour, but not on terms that are acceptable to all the other railroads.

February Earnings.

February earnings as reported by 32 railroads so far are in the aggregate nearly the same as last year, as follows:

	1885.	1884.	Decrease.	P. c.
Earnings	$10,338.355	$10,373.240	$54.885	0.53

Because of the snow blockades this year a larger decrease would not have been surprising, the more so because most of these 32 railroads had an increase in earnings last year, the 28 of them which then reported having an increase of $518,402, and this year a decrease of only $74,578, so that they have still $443,824, or about 4½ per cent., more earnings than in 1883. But they had not much increase in mileage this year, and a great deal last year, five companies northwest of Chicago increasing 2,417 miles in 1884 over 1883, and only about 950 miles in 1885 over 1884, most of the latter being by the Canadian Pacific, which, by the way, gained $188,000 this year, so that but for this the other 31 railroads would have had a decrease of 2½ instead of ½ per cent.

It is noticeable, however, that the railroads most

affected by the snow blockades for the most part report no great decrease last February, their earnings in that month having been for four years:

	1882.	1883.	1884.	1885.
Chi., Mil. & St. P.	$1,376,377	$1,257,046	$1,317,064	$1,346,000
Chic. & N. W.	1,474,176	1,311,395	1,504,100	1,342,300
Chi., St. P., M. & O.	333,439	283,601	331,607	306,200
Bur., C. R. & N.	225,630	187,001	201,965	202,536
Ill. Cen. in Iowa.	156,605	126,824	131,643	100,839
Chi. & Alton	517,897	557,384	573,284	535,395
Total	$4,084,124	$3,723,251	$4,059,753	$3,833,270

The decrease from last year is but $226,483 (5½ per cent.), but the remarkable fact appears that these railroads earned more in 1882, after the worst crops for many years, than in any year since, though their aggregate mileage meanwhile has increased from 10,079 to 12,077 miles, or 20 per cent., so that their average earnings per mile were $405 in 1882, and only $317½ this year. In view of this, we shall be glad to charge the snow with having reduced the February earnings of the Northwestern railroads materially this year. It was time they increased. Aside from these Northwestern roads, the most notable changes are great decreases on the Michigan lumber roads—41 per cent. on the West Michigan, 31¼ on the Detroit, Lansing & Northern and 32¼ on the Flint & Pere Marquette—with which snow may have had much to do, as well as a smaller traffic offering. There is a small gain on the Illinois lines and Southern Division of the Illinois Central, leaving their earnings a little less than in 1883 and 1881, however. The Louiville & Nashville earned 6½ per cent. more than last year, when it had more than ever before, but the Mobile & Ohio gained but 1½ per cent., and had smaller earnings than in 1880, 1881 or 1883. The Northern Pacific has a gain of 9½ per cent., after a gain last year of 40 per cent., and it earned more in February than in January. The St. Louis & San Francisco earned 8 per cent. less than last year, but a quarter more than in any earlier year.

Further returns will be required to ascertain the general course of earnings in the month, there being very little to indicate it on the lines east of Illinois and north of the Ohio and the Potomac, including all the trunk lines and their connections, unless it be the decrease of 23¾ per cent. on the Boston, Housac Tunnel & Western, which heretofore has shown a gain in the face of low rates.

We have often spoken of the narrow margin of the earnings of the railroads owned and controlled by the Pennsylvania Railroad Company which is available for dividends to its stockholders. Nothing shows this more clearly than a comparison, as follows:

	1884	1883.	1882.
Gross earnings	$97,849,875	$105,653,532	$101,514,926
Divisible profits.	6,980,521	8,949,195	8,287,764
Per cent. of earnings.	7.13	8.46	8.12
Dividends paid	6,560,787	7,530,650	6,890,715

Thus last year the portion of the gross earnings available for the Pennsylvania stockholders was only 7⅛ per cent. of the whole, and the year before, but 8½ per cent.

It must be remembered that we are speaking only of the profits available to the Pennsylvania Railroad Company, not of the whole amount paid in dividends by the controlled roads, which do not go to the Pennsylvania Railroad Company at all, or only in proportion of the stock of these roads which it holds. A very large portion of the latter dividends are a fixed charge of the Pennsylvania Railroad Company, as those of the United Railroads of New Jersey and the Pittsburgh, Fort Wayne & Chicago, and though it is not directly responsible for the fixed charges of many of the other roads, as of the Philadelphia, Wilmington & Baltimore, the Northern Central and the Grand Rapids & Indiana, it has such interests in them that it cannot afford to have them make default—which, in the case of the roads named, is a much more remote possibility than in that of many other lines which the Pennsylvania controls. Really, the charges which should be met before it is prudent for the Pennsylvania Railroad Company to pay a dividend absorb all but a very small part of the gross earnings of its system, so that a comparatively small decrease in the latter takes away a very large part of the divisible profit.

It is for this reason that it is exceptionally important for this company to be very conservative in incurring obligations and paying dividends, as the present management insists on being.

It might be thought that under these circumstances it is not desirable to reduce the payments into the fund for the purchase of guaranteed securities from the $600,000 now required to the 1 per cent. of the profits proposed by the directors, which last year would have required but $86,000. But while this fund virtually reduces the company's fixed charges, it is advantageous only when the guaranteed securities can be purchased at low prices, otherwise the company gets but low interest on the money it invests in them. The prices were very low when the fund was established, in 1878, and the chief object of it was to restore the company's credit, which has been restored, as may be judged by the fact that Cleveland & Pittsburgh stock, with 7 per cent. dividends guaranteed by the Pennsylvania, sold as low as 63½ in 1878, and even Pittsburgh, Fort Wayne & Chicago stock (then earning a profit over the rental) at 85, and Erie & Pittsburgh 7 per cent. *bonds* at 96, while now they bring 137½, 124, and 111 respectively. It could not but be a good bargain for the Pennsylvania to pay 80, 90 or 100 for what were virtually its own 7 per cent. obligations, but the bargain is not so tempting at 110, 120 or 130.

The New York Central & Hudson River Company last week declared a dividend of 1 per cent. for the first quarter of 1885, against 1½ per cent. for two quarters previous and 2 per cent. always before. The declaration of the dividend was accompanied by a statement of earnings and expenses, estimated for March, indicating that the profit per share earned during the quarter would be $1.05. In the previous quarter it was $1.54, so there was no appreciable surplus carried over, and a reduction of the dividend was the only sensible course. But the profit is not very much less than in the corresponding week of last year, when it was $1.22 per share, through east-bound traffic being badly demoralized then—worse in March than it has been at any time this year as yet—but other through traffic paying well. As besides the loss on through passengers and through west-bound freight the road suffers by a reduction of 50 per cent. on most of its local passenger traffic, and moreover has larger fixed charges, it is astonishing that there should be so small a reduction in the profits.

The through shipments from New York to the West, in spite of the reduction of about one-third in the rates in February, were 12 per cent. less this year than last, a little more than in 1883, 30 per cent. less than in 1882 (when rates were much lower than now even), 7 per cent. more than in 1881, 5 per cent. less than in 1880 and much more than in the other years in which they have been recorded. They were slightly more than in January, but not so much larger as usual. As the rates are now so low as to be likely to attract the shipments that go by more circuitous routes usually, the showing is not favorable, and indicates that merchandise sales have been materially less than last year. What is most noticeable, however, is the fact that the decrease in rates has apparently no effect on shipments. In 1881, when rates were reduced (in the summer) to about the present figures, there was an immediate and great increase in the tonnage shipped—30 and even 60 per cent. in some months. Then, however, the iron business was active, and imported scrap, pig iron, blooms, etc., arrived in large quantities. This would perhaps not have gone forward by rail at all at the full rates (though a special low rate existed for such freight), and would have gone by canal but for the reduction. Now there is little or no freight of the kind, and the consumption of merchandise would probably hardly increase at all were it carried for nothing.

Chicago, Burlington & Quincy Earnings in January.

The January earnings of the Chicago, Burlington & Quincy Railroad, both gross and net, were larger than ever before, which, however, is not so notable as it would be if these January earnings had not been stationary for three years, during which the mileage of the road increased nearly one-seventh, the 2,924 miles worked in January, 1882, earning a trifle more gross and a fifth more net than the 3,331 miles worked in 1884. For six successive years the miles, earnings and expenses in January have been:

Year.	Miles.	Gross earnings.	Expenses.	Net earnings.
1880	1,857	$1,432,740	$651,304	$781,346
1881	2,772	1,407,948	711,890	506,058
1882	2,924	1,658,834	888,919	769,915
1883	3,229	1,625,680	818,283	807,397
1884	3,331	1,648,220	1,012,705	635,515
1885	3,448	1,992,484	1,129,954	862,530

The increases over last year and over 1883 are:

	Gross earnings.	Expenses.	Net earnings.
1884:			
Amount	$344,264	$127,249	$227,015
Per cent.	20.9	11.6	35.4
1883:			
Amount	$366,804	$311,671	$55,133
Per cent	21.2	38.0	6.8

Thus while the net earnings last January were 35½ per cent. more than in 1884, they were not 7 per cent. more than in 1883. It is rather that this year's business is normally large while that of last year was abnormally small that causes the great gain of this year.

The earnings last January, however, were unusually large compared with previous months. Usually there is a very large decrease from December to January; this year a very small one. The amount and per cent. by which the gross earnings in each January have been less than those of the previous December have been:

1881.	1882.	1883.	1884.	1885.
$244,070	$246,656	$401,380	$522,698	$67,873
15.7	13.0	19.8	24.0	3.3

The earnings were not small last December, though a little less than the year before, and that there should have been so little decrease from them in January seems remarkable. One might explain it by the fact that there is a great corn crop on the road this year; but in fact the corn *movement* was as large last year in January as i was this year (11,581,970 bushels going to the Northwestern markets in 1884 and 11,096,123 this year); and last year the supply had to come chiefly from the country west of the Missouri, largely on the lines of this road, and of whose total production it carries a large share. It is not at all certain that it carried more corn this year than last. Last year, however, the competition with the Union Pacific was cutting down earnings largely.

The net earnings per mile in January in successive years have been:

1880.	1881.	1882.	1883.	1884.	1885.
$421	$217	$263	$250	$191	$252

They were, therefore, not extraordinarily large this year.

The February earnings promised to keep up at the same rate when the month opened, but the snow blockades seem to have affected this road even more than those further north, and these at once increase expenses and decrease receipts. The increase in expenses due to a great mortality in rolling stock will not be felt wholly in February, however, but will extend over March also. Last year February was an exceptionally favorable month, the gross earnings having been nearly as great as in January this year, and the net earnings $95,635 (11 per cent.) greater. The road will have done very well this year, under the circumstances, if its net earnings for the two months are as large as last year, but the prospect for the spring months is favorable.

Chicago through shipments eastward increased again in the first week of March, when they were nearly 15 per cent. more than the week before. There was no obstruction of the railroads except that due to a disorganized rolling stock, and the cars of Western roads that had been delayed must have all got in, so that the shipments were probably equal to the offerings, which is further indicated by the fact that the rates seem generally to have been down to 20 cents, though nominally the rate of 25 cents continued, and balances will be calculated on that basis.

The shipments of the first week of March this year, and those of corresponding weeks for five years previous, have been:

1880.	1881.	1882.	1883.	1884.	1885.
54,353	28,085	48,681	72,051	42,462	60,981

Thus the shipments this year were 43½ per cent. more than last year and larger than in any other except 1883. The smallness of the shipments in 1881 was due to snow blockades, which were more general then than any we have had this year.

The shipments in each of the last six weeks, and the percentage going by each railroad, have been:

	Week ending.					
Tons:	Jan. 31.	Feb. 7.	Feb. 14.	Feb 21.	Feb.28.	Mar.7.
Flour	14,914	19,219	11,282	8,906	15,549	17,153
Grain	50,340	52,131	30,913	22,887	30,913	36,354
Provisions	10,483	10,025	3,846	8,044	6,706	7,474
Total	75,737	81,375	46,041	39,837	53,168	60,981
Per Cent.:						
C. & Gra'd T.	6.5	7.0	6.4	2.0	6.0	10.2
Mich. Cent.	29.0	8.3	5.8	15.3	11.0	8.1
Lake Shore	21.3	29.4	26.0	19.7	18.7	17.0
Nickel Plate	4.5	3.3	7.4	7.1	8.2	5.1
Ft. Wayne	13.6	20.0	12.8	20.8	22.5	24.6
C., St. L. & P.	7.0	11.0	19.8	12.0	13.8	14.6
Balt. & Ohio	7.4	7.8	6.2	9.6	9.1	7.3
Ch. & Atlantic	10.7	13.2	15.6	14.1	10.7	13.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

There was an increase in each of the three freights last week, 17½ per cent. in grain, 10⅛ in flour and 11⅛ in provisions. The flour shipments were proportionally much larger than when the total shipments were largest, four and five weeks before.

In percentages the greatest change was by the Chicago & Grand Trunk, which had long carried much less than its apportioned share, but probably is now not ahead in the pool. But the Michigan Central continues to carry much less than its percentage, and may be still ahead in the pool. The Fort Wayne, which has been behind in the pool, and may be still, carried an unusually large share, and the Chicago & Atlantic also much more than its allotted proportion. Generally the shipments seem to tend to working off the "over" and "short" accounts in the pool, and by April 1, when the Chicago & Grand Trunk withdraws, they may be substantially even, if the live-stock pool is not much out of balance.

It was just after this time last year that rates began to go to pieces and shipments became enormous. Probably at similar rates there might be similar shipments this year, and there is apparently nothing to keep up rates except the prospect of a late opening of navigation. The very severe weather in the winter has doubtless made the ice in the Straits unusually thick and solid, and with ordinary spring weather this will make the opening late. However, the direction of the winds after the ice has begun to break up, as well as the temperature, has much to do with the opening of the Straits. The date of this was not very early last year—April 24. Earlier openings since 1870 were April 3, in 1871: April 20, in 1877; March 14, 1878; April 23, 1879; April 5, 1880, and April 5, 1882. The latest dates meanwhile were May 1, 1873, and May 4, 1881. From this time we may expect it to be five to six weeks before shipments can be made from Chicago by lake—possibly as many as seven weeks, or as few as four weeks. If the railroads used any means to restrict their own competition, doubtless they could have a fair

traffic at the full 25-cent rate until the opening; but without some co-operation it is hard to see why rates should keep up any better than they did last year, when, even with shipments exceeding 90,000 tons per week, they kept down to 15 cents and yielded no profit whatever.

The blockades were so far overcome by the last week of February that the receipts of grain at the Northwestern markets were not far below the average again. The decrease during the blockade, indeed, has not been so large as most seem to think, the receipts of all grain at the Northwestern markets in successive weeks having been:

Week to	Bushels.	Week to	Bushels.
Jan. 10	4,786,675	Feb. 7	7,370,601
" 17	5,694,552	" 14	3,758,634
" 24	4,611,883	" 21	2,732,640
" 31	5,625,383	" 28	5,055,911

The average in January was about 5,180,000 bushels per week. In the two weeks of blockade, the receipts were about one third less than this, but for the four February weeks they were not very much less than in the four January weeks, namely, 18,917,786 bushels, against 20,718,493, a falling off of less than 10 per cent.

For 12 years the February grain movement has been:

Year.	Northwestern.—Receipts.	Northwestern.—Shipments.	Atlantic receipts.
1885	18,917 786	11,669,582	12,935,143
1884	18,352,318	10,374,136	7,244,691
1883	18 955,983	12,863,301	13,292,556
1882	10,950.668	8,622.908	7,871,739
1881	8,166.045	6,234 352	10,775.295
1880	14,578.150	6,890,410	10,635,355
1879	11.895,405	6,742,362	17.209,813
1878	9,915,232	8,034.384	14,836.506
1877	7,908.895	4.413,280	8.133,821
1876	10,680,708	5,843,175	8,046.062
1875	6,258,386	2,688,878	5.951,798
1874	8.772,748	4,484,648	7,476,748

This shows that the Northwestern receipts last February were very nearly as large as they ever have been in February, in spite of the snow blockade, and very much larger than in any year previous to 1883, with very little variation for the last three years. The shipments of these markets were larger than in any other year except 1883, and 12 per cent. more than last year, and enormously greater than in any year before 1883. The receipts of the Atlantic ports, however, while 78½ per cent. more than last year, and but 2¾ per cent. less than in 1883, were 25 per cent. less than in 1879, and 13 per cent. less than in 1878—due doubtless to the fact that large shipments were then made from the country east of the Mississippi and south of the lakes which are not recorded at any Northwestern market. Before 1882 the Atlantic receipts were always much greater than the Northwestern shipments, and often greater than the Northwestern receipts. In 1878 they exceeded the Northwestern shipments by 6,800,000 bushels (84 per cent.), and in 1879 by 10,557,000 bushels (156 per cent.). In 1883, and again this year, the Atlantic receipts have again exceeded the Northwestern shipments slightly.

Altogether the February grain movement was larger this year than in any other except 1883, and very little less than then, though the weather for half the month was very unfavorable.

The east-bound rates were formally reduced last Tuesday to the basis of 20 cents for grain, flour and mill stuffs, and 25 cents for provisions from Chicago to New York, by Mr. Fink, on the ground that these rates were commonly made. This is a reduction of five cents, but is the rate at which nearly all the shipments have been made for some time, and has been the basis of the agreed rates at several places. Freights of the eighth class, other than grain, flour, mill-stuffs, oil-cake, and cotton-seed cake and meal, will remain at the old rate of 25 cents, and the articles named will, dating from April 6, form a new class, 13, while provisions also will then be taken from the seventh class and made the twelfth. A great many other articles have been put into the seventh and eighth classes, and it is not often necessary to change the rates on them, as it is on grain, flour and provisions; and by putting the latter in classes by themselves, the changes made need affect only what it is necessary to affect.

The advantages enjoyed by the use of the absolute block system are forcibly illustrated by the experiences of the last month or two on a good many roads. To those familiar with the actual practice in the running of snow-plows, it is a well-known fact that instances are frequent where the view is so obscured that it is absolutely unsafe to proceed except on the popular American plan of trusting to luck. Not only do the clouds of snow preclude any extended view ahead, but, especially in a dark night, by coating the windows or otherwise, make it often utterly impossible to see a danger signal, in however faithful hands it may be; and this at a time when torpedoes are the least available and the least reliable. In the numerous and severe storms of the winter, which we hope is now bidding us good-bye, the block system must have commended itself (whether bidden or unbidden) to the minds of a good many road-masters as not only an advantage and a convenience, but as an absolute necessity. A road-master (or anybody else) with any sort of development in the cautionary department of his cranium would certainly take this view (and would perforce *invent* a block system if none existed), provided he personally rode on the plow. Perhaps they don't all do this. Every road-master certainly ought to, and in some cases invite the general manager and one or two directors to go along with him and see the difference between this sort of conveyance with cracker-and-cheese buffet in winter and a director's car with dining-car annex in summer.

Every road whose telegraph stations are not more than a hundred miles apart should have the facilities for improvising a station-to-station block system at any time; for no matter how long the sections or how much time it may take, it is the only method that is even tolerable, not to say absolutely safe, for a plow in a heavy, blinding snow. Different kinds of snow, damp and compact, or light and feathery, and different depths, etc., require different rates of speed, so that the idea of securing safety by merely reducing speed is not always practicable.

The map published by the proprietors of the Janney couplers, and given as an advertisement in this number of the *Railroad Gazette*, shows very clearly that very decided progress has been made in the way of trying and adopting safety couplers in this country. A map of this kind shows more clearly than words can the extent to which a device is used, and what lines have adopted or are testing it. In a particular device of this kind the geographical information has a special importance, since the convenience of interchange may determine a line to use an apparatus because it is already adopted by connecting lines with which interchanges are most frequent. But aside from this, extent of use can in no way be shown so well.

On a Western railway during one of the recent cold snaps, of which there have been so many this winter, a train was delayed because the pumps and injector would not work. On investigation it was found that the cover to the water-tank was frozen fast, and it was believed that the tank was thus hermetically sealed up. Of course as the water was exhausted there was a partial vacuum formed, which finally was sufficient to collapse the tender hose and thus stop the water from flowing to the pumps and injector. This at any rate is the explanation given, and it is submitted to the consideration of our readers to learn if any of them have had any like experience.

The question of the propriety of the works for the repair of the foundations on the Chestnut street bridge, which was raised by a communication in our issues of Jan. 30 and Feb. 20, was up for discussion at the last meeting of the Engineers' Club, of Philadelphia, the general purport of the discussion being decidedly to support the views advanced in the communications referred to, viz., that the thrust of the main river arch had little if anything to do with the failures of the abutment arches and retaining walls. Accurate transit points have been set for the purpose of determining the question more definitely. Should the landward abutment still move eastwardly, the indication will be strong that the original diagnosis of the difficulty with the foundation, which resulted in the sinking of the inclined pneumatic tubes as struts, was not correct; but the point cannot yet be considered as definitely decided, although the fact (if it be a fact as stated), that no movement landward of the main abutment has occurred, increasing the river span, is alone a strong indication that such is the case.

Record of New Railroad Construction.

Information of the laying of track on new railroads in the current year is given in the present number of the *Railroad Gazette* as follows:

Lehigh Valley.—This company has laid track on the line from its freight station in Buffalo, N. Y., to the city line, 2 miles.

Little Rock & Fort Smith.—A branch is completed from Coal Hill, Ark., to coal mines, 2 miles.

This is a total of 4 miles, making 131 miles thus far reported for the current year. The new track reported to the corresponding date for 14 years past has been:

	Miles.		Miles
1885	131	1878	215
1884	286	1877	102
1883	329	1876	285
1882	823	1875	99
1881	427	1874	180
1880	733	1873	348
1879	204	1872	566

This statement covers *main track only*, second tracks and sidings not being included.

NEW PUBLICATIONS.

Report of the Third Annual Meeting of the American Street-Railway Association. 1884.

This thick and rather luxurious pamphlet of 212 pages is an evidence of vigorous life in the Association, and contains a great deal of valuable information on matters connected with the construction and operation of street railways; including cable and electric motors, construction and maintenance of track, veterinary surgery, bell-punches, snow-plows, car repairs and other similar matters. If the Association (which is only two years old) continues its work as faithfully as it has begun, its reports will be invaluable for those having to do with the street railway in any of its forms.

TECHNICAL.

Engineers' Club of St. Louis.

A meeting was held in St. Louis, March 4, 22 members and three visitors being present.

Mr. Henry B. Wood was elected a member of the Club.

The next order of business was the reading of a paper on "Treatment of Wood for Street Pavements," by Messrs. Caldwell and Miller. It was discussed by Messrs. Constable, Johnson, Robt. Moore, H. C. Moore and Lansden. Mr. Theo. Plate, President of the American Wood Preserving Co., expressed it as his opinion that the idea that gum wood was a cheap wood was a mistake, because when all heart wood was required it necessitated more work, and, consequently, greater expense in securing it than has heretofore been anticipated.

Mr. Lansden exhibited a section of water-pipe from Fall River, Mass., which had lain about 18 months in a bed of cinders, where it was submerged in tide-water every 24 hours. It had disintegrated two-thirds of the way through, leaving a substance as soft as graphite, the pitch coating of the pipe still being plainly visible, both inside and out.

Adjourned.

Western Society of Engineers.

The 204th meeting was held in Chicago, March 3. Mr. Randolph was called to the chair.

The Secretary read a letter from President Williams, appointing the committee voted at the last meeting:

On Topics: Messrs. Artinstall, Cole and J. Nichol.

On Endowment Fund: Messrs. Chanute, Cregier and Green.

The Secretary read the paper presented at the last meeting by Mr. R. F. Hartford, "Some New Sewer Formulæ." Mr. Cooley offered the following, which was seconded by Mr. Cregier, and unanimously adopted:

"*Resolved*, That President Williams be, and is hereby, requested to continue his valuable services as the representative of this Society in the Association of Engineering Societies."

Adjourned.

Engineers' Club of Philadelphia.

The regular monthly meeting was held in Philadelphia, Feb. 21, the President in the chair; 23 members and 2 visitors present. The Secretary presented, for Mr. Henry A. Vezin, Diagrams for Determining Belts, Pulleys and Shafts, with a description thereof; also similar diagrams for Cast-iron Cogs.

Mr. J. Milton Titlow presented a paper, illustrated by drawings and photographs, upon the Strengthening of the West Main Abutment of the Chestnut Street Bridge in Philadelphia. (This work was described and illustrated in the *Railroad Gazette* for Jan. 30 last, page 68.) After the reading of the paper a discussion followed.

Prof. HAUPT did not wish to appear to criticise adversely the conclusions of the writer, but he felt disappointed that the paper did not contain some data which would support the theory which led to the use of the piles in their present position. This misconception of the problem arises apparently from a failure to distinguish which of the equal and opposing forces is the action and which the reaction, or which the power and which the resistance. If the damage to the west abutment was caused by the *thrust of the iron arches*, as alleged, then its effect would be first manifested on the abutment pier and the adjoining brick arch, before reaching the extreme or land side of the second masonry arch. The writer states that this wall has been thrust *back*, while his measurements show that the span has been *reduced* in some places nearly half a foot, and that the reduction of span is greatest at the springing line near the head walls, and also near the ground. He admits that the main abutment-pier has *not* moved, nor has the one to the west of it, between the two masonry arches, as the eastern span of 60 ft. is not affected. The span of the second arch could only be *reduced*, therefore, by its abutment wall moving *forward*.

Prof. HAUPT believed that the defects of the bridge resulted from a slight settlement or springing of the piles under the corners of the foundation of the abutment and approach walls, thus reducing the frictional resistance of the masonry on the grillage, and permitting the excessive pressure of the earth filling, especially when saturated with water, to overcome the inertia of the masonry in these walls, and break the bond, which, in some places, was very weak, causing the large cracks in the approaches and the first arch. He suggested that the remedy should have been applied originally at this point by the introduction of screw or disc piles around the outside abutment, by which the unit pressure might have been reduced to any desired extent. The present tubes are being made to abut against a part of the foundation which is admittedly rigid, are placed at some 120 ft. from the weak point, and in such a direction as to oppose no resistance to this thrust. There is nothing in the paper relative to the effect produced by the former remedies of heavy sills and ties, nor to show that they were so inefficient as to render this last device a necessity in any position.

Mr. HOWARD MURPHY thought that these heavy sills should never have been built. They are, in reality, built-up horizontal struts or columns, connecting the substructures, and were intended to relive the main abutment of a portion of the horizontal thrust of the west iron river arch, by conveying it to the approach abutment through the intermediate pier. That they would, if brought to firm end bearings, have increased the stability of the structure, whichever way it has a tendency to move, there is no doubt, if these were all the conditions to be considered. But the Thirtieth Street Extension of the Pennsylvania Railroad passes under one of the arches. The traffic is entirely freight. The heaviest engines and trains may be frequently stopped and started under the bridge, as these tracks are practically a portion of the yard. The struts were laid but a short distance under the surface. If loose, they did no good. If tight, they afforded a very convenient rigid medium for the transmission to the bridge foundations of every shock and hammer blow incident to heavy railroad traffic. The often observed effect of light machinery upon the masonry of buildings would seem to indicate that a bridge which could stand this kind of thing without serious rupture was not such a bad bridge, after all. As to whether or not the original designs for the foundations of Chestnut street bridge had been faithfully carried out by the contractor, Mr. Murphy stated that any assumption of careless *supervision* of the contractors was absolutely inadmissible. He differed with Prof. Haupt as to the easterly or riverward movement of the structure, because there seem to be no cracks or changes which *clearly* show this, and, on general principles, because a pier is not likely to move under the thrust of a short high arch against the thrust of a long, flat arch; and because a failing retaining wall is not likely to bulge, horizontally, *toward* the retained material, particularly when tied at its ends by walls returning at right angles to it, and against which latter walls there is a greater thrust of arch, owing to some excess of weight, of the spandrels and parapets, over the earth-filling in the middle. Comparison with the accurate transit points, entirely external to the structure, which Prof. Haupt has located, may, however, reveal changes, in one or two directions, now indeterminable.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atchison, Topeka & Santa Fe, annual meeting, at the office in Topeka, Kan., April 16.

Chicago & Alton, annual meeting, at the company's office, in Chicago, April 6, at 10 a. m. Transfer books close March 14.

Chicago, St. Louis & Pittsburgh, annual meeting, in Indianapolis, March 18.

Denver & Rio Grande, meeting of the consolidated bondholders for consultation with the trustees, at No. 21 Nassau street, New York, at 1 p. m., on April 16.

Florida Railway & Navigation Co., annual meeting, in Fernandina, Fla., March 17, at noon.

New York Central & Hudson River, annual meeting, in Albany, N. Y., April 15.

Pennsylvania Railroad, annual election, at the company's office, in Philadelphia, March 24.

Pittsburgh, Cincinnati & St. Louis, annual meeting, at the office in Columbus, O., March 17.

Union Pacific, annual meeting, at the office, in Boston, March 25.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Lehigh Valley, 1½ per cent., quarterly, payable April 15, to stockholders of record March 18. This company drops from 2 to 1½ per cent.

Manhattan, 1½ per cent., quarterly, payable April 1. Transfer books close March 20.

New York Central & Hudson River, 1 per cent., quarterly, payable April 15. Transfer books close March 14. The company drops from 1½ to 1 per cent.

New York & Harlem, 2 per cent. from the profits of the city line, payable April 1. This is in addition to the 8 per cent. paid by the lessee as rental for the steam railroad.

Western Union Telegraph, 1½ per cent., quarterly, payable April 15. Transfer books close March 20.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *National Association of General Passenger & Ticket Agents* will hold its next meeting in New Orleans, on Tuesday, March 17.

The *Southern Time Convention* will hold its spring meeting in New Orleans, Wednesday, March 25.

The *General Time Convention* will meet at the Lindell Hotel, in St. Louis, on Wednesday, April 8.

The *Association of American Railroad Superintendents* will hold its half-yearly meeting in Richmond, Va., on Wednesday, April 15.

The *American Association of Train Dispatchers* will hold its annual convention in Denver, Col., on Wednesday, June 3.

The *Master Car-Builders' Association* will hold its annual convention at the Hygeia Hotel, Old Point Comfort (Fortress Monroe), Va., beginning on Tuesday, June 9.

The *Master Mechanics' Association* will hold its annual convention in Washington, beginning on Tuesday, June 16.

The *Car Accountants' Association* will hold its annual convention in Minneapolis, Minn., beginning on Tuesday, June 23.

The *General Baggage Agents' Association* will hold its half-yearly meeting in St. Paul, Minn., on Wednesday, July 15.

The *Master Car-Builders' Club* will hold regular meetings at its rooms, No. 113 Liberty street, New York, on the evening of the third Thursday in each month.

The *New England Railroad Club* will hold its regular meetings at its rooms in the Boston & Albany station, in Boston, on the evening of the fourth Wednesday in each month.

The *Western Railway Club* will hold regular meetings at its rooms, No. 102 Adams street, Chicago, on the third Wednesday in each month.

Master Car-Builders' Club.

A business and social meeting of the Master Car Builders' Club will be held at the Rooms, No. 113 Liberty street, New York, Thursday evening, March 19, 1885, at 8 o'clock.

Subject for Discussion: The present general condition of Freight Cars employed in interchange traffic.

All railroad men interested are invited to attend.

ELECTIONS AND APPOINTMENTS.

Anniston & Chattanooga.—Mr. W. G. Sears is Engineer in charge of the preliminary surveys of this road.

Atlanta & Charlotte Air Line.—At the annual meeting in New York, March 11, the following were elected: President, H. W. Libby; directors, James E. Grannis, Richard Irvin, Jr., Eugene Kelly, R. A. Lancaster, B. R. McAlpine, P. P. Dickinson, Hiram Sibley, Robert Stobo, H. W. Twombly, Skipwith Wilmer. The road is leased to the Richmond & Danville.

Chicago, Burlington & Quincy.—Mr. R. Ten Broeck has been appointed General Eastern Agent in place of J. Q. A. Bean, deceased.

Chicago & Grand Trunk.—At the annual meeting in Chicago, March 11, the following directors were elected: Joseph Hickson, L. J. Seargeant, J. McCaffrey, A. H. Dolton, W. F. Mitchell, J. McMillan, W. S. Shepherd, W. C. Beardsley, E. W. Whitman, E. W. Middaugh, F. A. Hoar, T. S. Stanfield and D. F. Skinner. The directors then elected the following officers: President, Joseph Hickson; Treasurer, J. H. Muir; Secretary, C. Percy.

Chicago & Great Southern.—Mr. Wm. Foster has been appointed Receiver of this road in place of P. B. Shumway, resigned.

Columbus, Hocking Valley & Toledo.—Mr. H. J. Falkenbach has neen appointed General Passenger and Ticket Agent, in place of Mr. W. H. Harrison, resigned.

Columbus, Hope & Greensburg.—At the recent annual meeting the following directors were chosen: W. W. Hamilton, B. B. Jones, J. D. Lyle, John E. Robbins, J. G. Schwartzkopf, Greensburg, Ind.; W. H. Acken, Hope, Ind.; Horace Scott, Louisville, Ky. The board elected Horace Scott, President; C. L. Ewing, Secretary; W. J. Lucas, Treasurer.

East St. Louis Terminal.—This company has elected the following directors: John Coyle, S. M. Davidson, J. M. Kinney, August Koerner.

Fort Madison & Northwestern.—Mr. S. B. Kenrick (heretofore Superintendent and Treasurer) is appointed Receiver of this road. Office at Fort Madison, Iowa.

Grand Rapids & Indiana.—At the annual meeting in Grand Rapids, Mich., March 5, the old directors were re-elected. The board subsequently re-elected W. O. Hughart President, with all the old officers.

Illinois Central.—At the annual meeting in Chicago, March 11, B. F. Ayer, James C. Clarke and Walter Luttgen were re-elected directors for four years, and Wm. Waldorf Astor, of New York, was chosen for two years, to fill a vacancy.

Louisville, New Albany & Chicago.—At the annual meeting in New York, March 11, the following directors were chosen: J. M. Fetter, E. D. Standiford, Louisville, Ky.; Robert R. Hitt, Mt. Morris, Ill.; John B. Carson, C. R. Cummings, Elihu Root, James D. Smith, Chicago; John Jacob Astor, Wm. Dowd, Robert Lenox Kennedy, Roswell G. Rolston, James Roosevelt, Samuel Sloan, New York. Messrs. Cummings, Carson, Root, Smith and Dowd are new directors.

Missouri Pacific.—At the annual meeting in St. Louis, March 10, the following directors were chosen: R. S. Hayes, St. Louis; S. H. H. Clark, Omaha, Neb.; F. L. Ames, Boston; Sidney Dillon, T. T. Eckert, George J. Forrest, George J. Gould, Jay Gould, A. S. Hopkins, Joseph S. Lowry, H. C. Marquand, Russell Sage, Samuel Sloan, New York.

New York, West Shore & Buffalo.—Mr. Charles W. Bradley is appointed General Superintendent in place of Mr. C. D. Gorham, resigned. Appointment took effect March 1. Mr. Bradley has been for some time past Superintendent of the Hudson River Division.

Pacific, of Missouri.—Mr. R. Wood Cruttenden, of St. Louis, has been appointed Receiver for any property which may remain to this old company.

Pennsylvania.—Mr. E. G. Dixon has been appointed Division Freight Agent of the United Railroads of New Jersey Division, in place of Mr. Walter Freeman, who is made Commissioner of the bituminous coal pool.

St. Louis Bridge.—This company on March 3 elected directors as follows: Gerard B. Allen, J. T. Morgan, Wm. Taussig, Edward Walsh, Julius S. Walsh.

St. Louis Coal Railroad.—Mr. R. J. Cavett (heretofore Superintendent and General Freight Agent) has been appointed Receiver of this road. Office at Pinkneyville, Illinois.

St. Louis, Fort Scott & Wichita.—At the annual meeting in Fort Scott last week the following directors were chosen: J. H. Dowland, J. W. Miller, A. W. Walburn, Fort Scott, Kan.; N. A. English, Wichita, Kan.; J. H. Richards, Iola, Kan.; R. S. Hayes, D. S. H. Smith, St. Louis; A. L. Hopkins, D. C. Moran, New York. The board re-elected R. S. Hayes, President; J. W. Miller, Vice-President and General Manager; J. H. Dowland, Secretary and Auditor; A. H. Calef, Treasurer; J. H. Richards, General Attorney; J. W. Miller, General Freight and Passenger Agent; W. S. Kent Cashier.

St Louis, Iron Mountain & Southern.—At the annual meeting in St. Louis, March 10, the following directors were chosen: G. W. Allen, R. S. Hayes, R. C. Kerens, R. C. Lackland, St. Louis; Henry Whelen, Philadelphia; T. T. Eckert, Jay Gould, A. S. Hopkins, Joseph S. Lowry, F. A. Marquand, Russell Sage, Samuel Shethar, John T. Terry, New York.

St. Louis Tunnel.—This company elected the following directors March 3: V. W. Fisher, W. S. Humphreys, A. J. Thomas, Wm. Taussig, Julius S. Walsh.

St. Louis Union Depot Co.—At the annual meeting in St. Louis, March 3, the following directors were chosen: Jay Gould, A. L. Hopkins, R. S. Hayes, J. F. How, A. H. Calef, Wm. Taussig, D. S. H. Smith. The following are the officers: Jay Gould, President; R. S. Hayes, Vice-President; J. A. Thompson Secretary and Treasurer; A. H. Calef, Assistant Secretary.

Shell Beach.—At the annual meeting in New Orleans, March 6, the following directors were chosen: Lloyd R. Coleman, John R. Elder, W. L. Elder, Lucas E. Moore, J. A. Shakspeare, M. R. Spelman, B. S. Storey. The board elected John R. Elder, President; Lloyd R. Coleman, Vice-President; M. R. Spelman, Secretary and General Superintendent; Lucas E. Moore, Treasurer; E. D. White, Attorney.

Southwest Pennsylvania.—At the annual meeting last week this company (whose road is leased to the Pennsylvania Railroad Co.) elected officers as follows: President, J. N. DuBarry: Directors, John P. Green, John K. Ewing, Wm. J. Howard, George F. Huff, Wm. A. Patton, Robert Pitcairn, George B. Roberts, B. F. Ruff, N. Parker Shortridge, Edmund Smith, George A. Torrence, J. F. Wentling.

Sussex.—Mr. M. Day is appointed Master Mechanic, with office in Newton, N. J., in place of Charles Phillips, resigned.

Syracuse, Phœnix & Oswego.—This company has been organized with the following officers: President, H. R. Low; Vice-President, E. Merry; Secretary and Treasurer, E. R. Paige; Chief Engineer, James Barnes, Phœnix, New York.

Toledo & Southwestern.—The directors of this company, successor to the Toledo & Indianapolis, are T. P. Brown, S. R. Follett, J. D. Ford, J. K. Hamilton and F. A. White.

Union Pacific.—Mr. George A. Sanderson is appointed General Eastern Freight Agent, with office in Philadelphia. Mr. S. Tibbetts succeeds Mr. Sanderson as Division Freight Agent at Salt Lake, Utah.

Wabash, St. Louis & Pacific.—At the annual meeting in St. Louis, March 10, the following directors (one-third of the board) were chosen for three years: Charles Ridgely, Springfield, Ill.; George L. Dunlap, Chicago; James F. Joy, Detroit; Sidney Dillon, Solon Humphreys, New York.

Warren & Sugar Grove.—The office of this company is at Warren, Pa.; the officers are: President, George P. Orr; Vice-President, A. J. Davis; Treasurer, F. Marck; Engineer, G. C. Hamilton.

PERSONAL.

—Mr. James E. Turk has resigned his position as Superintendent of the Valley Railroad of Ohio.

—Mr. Henry C. Sherburne has tendered his resignation as President of the Northern (New Hampshire) Railroad Co., on account of ill health.

—Mr. Charles Phillips has resigned his position as Master Mechanic of the Sussex Railroad, after serving on the road for a number of years.

—Mr. D. Robison, Jr., has been relieved from the position of Receiver of the Toledo & Indianapolis road, the line having been transferred to the purchasers.

—Mr. Robert A. Shaler, Engineer of Bridges and Buildings on the Chicago, Milwaukee & St. Paul road, has resigned that office to accept the position of Engineer and Superintendent for the firm of Rust & Coolidge, Engineers and Contractors in Chicago.

—Mr. M. L. Hinman, of the Brooks Locomotive Works, was recently elected Mayor of the city of Dunkirk, N. Y. Mr. Hinman entered into office March 9, when he made an excellent address to the City Council, urging several reforms in local affairs.

—Mr. William Armstrong, Supervisor of Trains of the Parkersburg Branch of the Baltimore & Ohio, died in Parkersburg, W. Va., March 2. He had been connected with the road for 25 years, rising from the position of freight conductor to the office which he last held.

—Mr. William M. Clements has tendered his resignation as Master of Transportation of the Baltimore & Ohio Railroad. He has been with the company for a number of years. His resignation has not as yet been accepted by the board. It is said that the cause of this action is a difference of opinion with General Manager Dunham.

—The Governor of Mississippi has appointed Gen. Edward C. Walthall United States Senator from Mississippi, in place of Mr. Lamar, now Secretary of the Interior. Gen. Walthall has been for a number of years connected with the lines making up the Southern Division of the Illinois Central, and is now Attorney for that company in the state of Mississippi.

—Hon. John S. Barbour, who recently retired from the presideney of the Virginia Midland Co. after 33 years' service, was presented, at Alexandria, Va., March 7, with a valuable gold watch and chain by the employés of the road. The watch was accompanied by an address expressing their high esteem for the late President and their regret at his retirement.

—Three members of President Cleveland's Cabinet have some connection with railroads. Mr. Daniel Manning, Secretary of the Treasury, is Albany city director of the Albany & Susquehanna Co. Postmaster-General Wm. F. Vilas has been Attorney for the Chicago & Northwestern Co. in Wisconsin. Secretary of the Navy Wm. C. Whitney was at one time for several years Trustee in possession of the Dayton & Union road.

—In the 40 years since it was opened for traffic, the Fitchburg Railroad has had six superintendents. The first was Mr. Samuel M. Felton, who had charge of the building of the road as Chief Engineer. He was followed by Lucien Tilton, also a civil engineer, who had been employed on one or two of the Northern lines, and who was succeeded by Liberty Bigelow, previously a large stage proprietor and mail contractor. The fourth was Wm. B. Stearns, who had been Chief Engineer of the road (and had learned his profession under Mr. Felton), and who was afterward President from 1864 until his death in 1883. He was succeeded as Superintendent by Mr. Charles F. Haywood, who had been Roadmaster, and who was replaced in 1878 by Mr. John Adams. Mr. Adams has been on the road since 1853, and has served as Foreman of shops, Master Mechanic, conductor, Purchasing Agent and Assistant Superintendent before his appointment as Superintendent.

—Mr. Herman J. Lombaert, who for a number of years was prominently connected with the Pennsylvania Railroad, died at his home in Philadelphia, March 11. He was born in Easton, Pa., in 1815, was educated in Philadelphia, and adopted civil engineering as a profession. In his younger days he was engaged, with others, in the work of preparing the surveys of the Philadelphia & Trenton and the Philadelphia, Wilmington & Baltimore roads. Mr. Lombaert went to South America in 1844, and was employed in surveying and locating a route for a canal from Carthagena to the Magdalena River. A year later he returned, and until 1850 was engaged on various public works in the Middle and New England states. In the fall of 1850 he entered the employ of the Pennsylvania Railroad Co., and was for a time General Superintendent, with headquarters at Altoona. Later he served as Comptroller and Auditor of the company, and from 1869 to 1872 was its Second Vice-President. In the latter year, on account of ill health, he retired from active business pursuits. Mr. Lombaert leaves one son and three daughters.

TRAFFIC AND EARNINGS.

Coal.

Anthracite coal tonnage for the two months ending Feb. 28, as given by the weekly reports of the companies, has been as follows for eight years past:

	Tons.		Tons.
1885	3,050,083	1881	4,040,900
1884	3,698,333	1880	3,273,493
1883	3,866,463	1879	3,395,082
1882	3,739,835	1878	2,308,960

The tonnage this year shows a decrease from 1884 of 648,249 tons, or 17.5 per cent. It is the lightest tonnage reported in the corresponding period for any year since 1878, but has apparently been sufficient for the requirements of the market.

Bituminous coal tonnages reported for the two months ending Feb. 28 are:

	1885.	1884.	Inc. or Dec.	P. c.
Cumberland, all lines	268,233	264,315	I. 3,918	1.5
Huntingdon & Broad Top	24,084	30,986	D. 6,902	22.3
Barclay R. R. & Coal Co.	44,754	60,025	D. 15,271	25.5
Pennsylvania R. R.:				
Clearfield	491,501	436,816	I. 54,685	12.5
Penn and Westmoreland	182,917	210,111	D. 27,194	12.9
Minor districts	258,692	286,424	D. 27,732	9.7
Total	1,270,181	1,288,677	D. 18,496	1.4

The Cumberland and the Clearfield are the only districts showing a gain in tonnage this year.

Coke tonnages reported for the two months ending Feb. 28 are:

	1885.	1884.	Inc. or Dec.	P. c.
Southwest Penna. R. R.	288,246	360,035	D. 71,789	19.9
Other districts Pa. R. R.	90,358	94,903	D. 4,545	4.8
Connellsville, *via* P. R. R.	18,529	52,489	D. 33,960	64.7
Total	397,133	507,427	D. 110,294	21.7

A light coke tonnage is to be expected for some time to come.

Cumberl and coal shipments for the week ending March 7, were 38,630 tons; total this year to March 7 was 306,862 tons; last year, 300,242; increase, 6,620 tons, or 2.2 per cent.

Actual tonnage passing over the Pennsylvania & New York road for the three months of its fiscal year from Dec. 1 to Feb. 28 was:

	1885.	1884.	Decrease.	P. c.
Anthracite	254,998	273,564	18,564	6.8
Bituminous	80,654	85,022	4,368	5.1
Total	335,662	358,586	22,934	6.5

The larger part of the anthracite comes from the Lehigh Valley road, of which this line is an extension.

Cotton.

Cotton movement for the week ending March 6 is reported as follows, in bales:

	1885.	1884.	Inc. or Dec.	P. c.
Interior markets:				
Receipts	30,136	31,293	D. 1,137	3.8
Shipments	47,459	53,081	D. 5,622	10.4
Stock, March 6	199,179	205,477	D. 6,298	3.1
Seaports:				
Receipts	56,866	68,720	D. 11,854	17.2
Exports	61,868	108,852	D. 46,984	43.1
Stock, March 6	769,049	895,112	D. 125,463	14.0

The total movement from plantations for the cotton year (from Sept. 1) to March 6 is estimated a 5,310,646 bales, against 5,229,715 bales last year, 6,041,232 in 1882–83 and 4,896,138 in 1881–82. A light movement may be expected for the rest of the year.

East-bound Freight Rates.

The following telegram reducing the rates on flour, grain and provisions, east-bound, was received in Chicago, March 10, from Commissioner Fink, and was acted on at once by the east-bound freight lines: "The Michigan Central Co. having requested that the reduction of the tariff be officially announced, on the ground that the 25-cent basis on grain is not maintained at Chicago, and that the local committees at various important centres have openly reduced their tariffs below that basis, notice is hereby given that, taking effect this date, the tariff rates on the following articles in the eighth class, viz.: grain, flour, feed, bran, meat, middlings, oil cake and meal, also cottonseed cake and meal will be on the basis of 20 cents, Chicago to New York. The present basis of 25 cents will continue in force on all other articles in the eighth class. The rate on provisions will be on the basis of 25 cents, Chicago to New York, and the present basis of 30 cents will remain in force upon all other articles in the seventh class and upon live hogs. The new east-bound clas-

sification, in which a number of articles are taken out of seventh and eighth classes and put in fixed classes has been adopted and will go into effect, April 6."

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

	1885.	1884.	Inc. or Dec.		P.c.
Two months ending Feb. 28:					
Boston, Hoosac Tun. & W.....	$55,062	$55,830	D.	$768	1.2
Bur., C. R. & No.	426,256	515,818	D.	89,562	17.3
Canadian Pac...	818,704	499,284	I.	319,480	63.9
Central Iowa.....	170,679	209 114	D.	38,485	18.4
Central Pacific..	3.044.0 0	2,852,355	I.	191,645	6.7
Ches. & Ohio....	524.941	546,692	D.	21,751	3.9
Ches., O. & S. W.	221,696	185.118	I.	36,578	19 8
Chi. & Alton	1,179.782	1,239,926	D.	60,144	4 9
Chi. & East. Ill..	232,358	232.891	D.	533	0.2
Chi., Mil. & St. P.	2,804 000	2,784,159	I.	79,841	2.9
Chi. & Nor'west.	2,840,400	3,006,518	D.	166,118	5.5
Chi., St. P., Min. & Omaha.....	640,700	681.509	D.	40,809	6 0
Chi. & W. Mich..	140,669	216,662	D.	75,993	35.0
Cin., Ind., St. L. & Chi	368,923	293,074	I.	75,919	25.9
Det., Lan. & No.	134.921	185,565	D.	50,644	27.2
Eliz., Lex. & B. S.	102,640	93,336	I.	9,304	9.9
Flint & Pere M..	274,104	378.307	D.	104,203	27.6
Fla Ry & N. Co.	181,632	177.430	I.	4.202	2.4
Illinois Central...	1.726,100	1,640,271	I.	85,829	5.2
Iowa lines.....	205,100	263,155	D.	58,055	22.1
Kentucky Cent...	101,447	91,299	I.	10,148	11.1
Long Island.....	287,969	273.693	I.	14,276	5.2
Louisv. & Nashv.	2,"53,454	2,054,748	I.	198,706	9.7
Mexican Central.	599,230	380,298	I.	218,932	57.6
Mil., L. S. & W..	145.355	145 825	D.	470	0.3
Mobile & Ohio...	365,455	340.511	I.	24.944	7.3
Northern Pacific.	1,123.144	1,134,188	D.	11,044	1.0
Ohio Central	159,753	170,547	D.	10,794	6.3
Ohio Southern....	88,649	65,094	I.	23,555	36.2
Roch. & Pitts....	152,034	140,687	I.	11,347	8.0
St. L. & San Fran.	618 596	649 809	D.	31.204	4.8
St. P. & Duluth..	144,298	126,445	I.	17,853	14 2
Wisconsin Cent..	199,750	222,515	D.	22,665	10.2
Month of January:					
Bur., C R. & No.	$223,719	$213.803	I.	$9,856	4 7
Net earnings...	50.887	60,150	D.	9.263	15.4
Ches. & Ohio....	292 910	280,621	I.	12.289	4.3
Net earnings...	77,977	65,610	I.	12,367	18.8
Chi., Bur. & Q....	1.992,484	1,648,220	I.	344,264	20.9
Net earnings...	862,530	635,514	I.	227,016	35.9
Cin., Ind., St. L. & Chi.	203.444	170,318	I.	33,126	19.5
Net earnings...	69,348	55,866	I.	13,482	24.1
Cin., I., St. L. & Chi	203,444	170,318	I.	33,126	19.5
Net earnings ..	69,348	55,866	I.	13,482	24.1
Cleve , Col., Cin. & Ind	256,093	272.343	D.	16.250	5.9
Eliz., Lex. & B. S.	55,641	47.388	I.	8,253	17.6
Net earnings...	14,504	3.566	I.	10,938	317.0
Ft. Worth & D...	22,718	26,534	D.	3,816	14.4
Net earnings...	10,300	8,707	I.	1,593	18.3
Kentucky Cent..	59,183	.....		.....	....
Net earnings...	10,887	.....		.....	....
L. Rock & Ft. S..	52,966	44,450	I.	8,516	19.1
Lt. Rock, M. R. & Tex.....	33.642	32,374	I.	1,268	3.9
Louis & Nash...	1,170,749	1,039,317	I.	131 432	12.6
Net earnings...	456.980	303,442	I.	153,538	50.6
Minn. & St. L....	130,076	126,602	I.	3,474	2.7
Mobile & Ohio...	201.681	179,228	I.	22,453	12.5
Net earnings...	53,817	51,438	I.	2,399	4 6
Northern Pacific.	553,582	614,132	D.	60,520	9.9
Net earnings...	113,008	164.809	D.	51.710	31.3
Ohio & Miss ...	302,418	320,401	D.	17,983	5.6
Rome, W. & Og.	114,395	81,040	I.	33.355	40.7
Net earnings...	33,253	*5,494	D.	38,747	....
Utah Central....	85,060	75,283	I.	9,786	13.0
Net earnings...	43,010	24,287	I.	18,723	78.0
Month of February:					
Boston, Hoosac Tun & W	$22,843	$29,960	D.	$7,117	23.7
Bur., C. R. & No.	202,536	201.963	I.	571	0 3
Canadian Pacific.	426.000	238,000	I.	188 000	79.0
Central Iowa.....	85.033	98,196	D.	13,163	13.4
Central Pacific..	1,397 000	1,402,570	D.	5.570	0 4
Ches. & Ohio....	232,031	266,071	D.	34.040	12.8
Ches., O. & S. W.	108,141	80.424	I.	27,717	34.6
Chi. & Alton ..	535.395	573,284	D.	37,889	6.6
Chi. & East. Ill..	107 025	107.467	D.	442	0.4
Chi., Mil. & St. P.	1,346,000	1,317,064	I.	28,936	2.2
Chi. & Nor'west.	1,342,300	1,504,100	D.	161,800	10.7
Chi., St. P., M. & O.....	306,200	331,600	D.	25 400	7.7
Chi. & W. Mich..	65,741	111,234	D.	45,493	40.9
Cin., Ind., St. L. & Chi.....	168,496	122,686	I.	45,810	21.0
Det., Lan. & No.	65,973	96,400	D.	30,427	31.7
Eliz., Lex. & B. S.	46,999	45,948	I.	1,051	2.3
Flint & Pere M..	129,755	191,856	D.	62,101	32.3
Fla. Ry. & N. Co.	85 141	85,232	D.	91	0 1
Ill. Central.....	840,912	813,609	I.	27,213	3.3
Iowa lines. .. .	100,839	131,643	D.	30,804	23.3
Kentucky Cent...	42,265	39,501	I.	2,764	7.0
Long Island.....	137,534	138,051	D.	547	0 4
Louisv. & Nash.	1,082,705	1,015,431	I.	67,274	6.6
Mexican Cent...	280,930	180 322	I.	100,608	55.9
Mil., L. S. & W..	72,770	76,120	D.	3,370	4.4
Mobile & Ohio..	163,774	161,283	I.	2,491	1.5
Northern Pacific.	569,562	520,085	I.	49,477	9 6
Ohio Central....	79.949	83,287	D.	3,338	4.0
Ohio Southern...	43,450	28,121	I.	15.329	54.7
Roch. & Pitts...	67,383	72,487	D.	5,104	7.0
St. L. & San F..	302.673	329,874	D.	27,201	8.2
St. P. & Duluth.	64.438	54,951	I.	9,487	17.2
Wis. Central. ..	97,512	104,620	D.	7,108	6.8
Year ending Dec. 31:	1884.	1883.			
Gal , H. & San. Ant.....	$2 902,591	$3,565,137	D.	$662.546	18 3
Net earnings...	903,753	1,333,498	D.	430,145	32.3
Louisiana West..	485.708	602,121	D.	116.413	19.3
Net earnings...	216,567	259,589	D.	43.022	16.5
Tex. & N. Orl'ns.	872.142	1,163,188	D.	291,046	25.0
Net earnings...	355,520	588,484	D.	232.964	39.6
Month of December:					
Gal., Har. & San. Ant....	$283.152	$288,257	D.	$5,105	1.8
Net earnings...	130,011	101,461	I.	28,550	28.3
Louisiana West.	60,992	54.619	I.	6,373	11.6
Net earnings..	32,789	24,035	I.	8,754	36.5
Tex. & N. Orl'ns.	95,753	92,284	I.	3,469	3.8
Net earnings. .	51,970	28,421	I.	23,549	82 9

* Deficit.

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Passenger Business to Washington in the Inauguration Week.

The Pennsylvania Railroad Co. last week handled an enormous passenger traffic, having carried very nearly 140,000 people to and from Washington. To do this all available cars on the road were brought into service, with a large number from controlled and connecting lines. Cars were taken from the West Jersey, the Camden & Atlantic, the Cleveland & Pittsburgh, and many other roads, including 40 borrowed from the West Shore. From Monday to Friday night 220 loaded passenger trains were run into and out of the Washington station, besides 110 trains of empty cars for the use of returning passengers. These trains consisted of 2,243 cars, and the force manning them consisted of 220 conductors, 440 engineers and firemen and 1,100 baggagemen and brakemen, and they carried in all 103,658 passengers. Fully 36,000 more of the visitors to the inauguration ceremonies went to Washington earlier and came home later in order to avoid the inevitable rush, and these people made it necessary to run extra trains for several days previous to the 2d and after the 6th of the month. In addition to the company's cars in use 315 Pullman sleeping and parlor cars were kept constantly on the road between Washington and Jersey City. Of course, with so large a number of extras, some slight delays were unavoidable, but this great number of passenger trains was moved without serious delay and entirely without accident. While the travel on the line from New York to Baltimore was very large, the great rush was, of course, on the 42 miles between Baltimore and Washington, where there was not only the local traffic from Baltimore to be accommodated, but the large number of passengers coming in from the Western lines over the Northern Central road.

The Baltimore & Ohio road also did an enormous passenger business to and from Washington during the week, but we have not as yet received any statistics from that company.

Transcontinental Fast Freight Line.

Active measures have been taken to bring into operation the new Transcontinental fast freight line. The Union Pacific has completed its quota of cars, and the other roads in the line are also nearly ready, so that the line will commence operations about March 16 with nearly 1,000 cars ready for service. This line will run over the Union and Central Pacific roads, and it is intended to make the fastest time ever made with through freight to the Pacific coast.

Passenger Rates.

The last week has been marked by sharp competition and cutting of rates from Cincinnati, the different lines, including the Pennsylvania, the Baltimore & Ohio, the Chesapeake & Ohio, the Erie & Cleveland, Columbus, Cincinnati & Indianapolis having reduced the first-class rate to New York to $7. The cutting was commenced by the Baltimore & Ohio selling tickets to Washington for $10. The Pennsylvania let this with a rate of $9, making the same figure to New York, which the other companies quickly reduced to $7.

Boston Traffic Notes.

The New York & New England road, during the month of February, brought 2,404 cars eastward from the Hudson River, and carried 2,334 westward. Of the east-bound cars 2,378 were loaded, 1,759 with coal.

The Boston & Albany road, in the month of January, delivered 13,370 freight cars to the New York Central at Albany, and received from the same road 12,477, compared with only 9,487 cars in January, 1884. The January movement of freight cars from Boston west was 9,218.

During the month of January 6,059 loaded and 213 empty freight cars came east through the Hoosac tunnel as against 4,934 loaded and 220 empty in the corresponding month of 1884, an increase in the former of 1,125 and a decrease in the latter of seven. In the month of February the comparative showing was as follows: 1885, 4,203 loaded, 201 empty; 1884, 4,934 loaded, 202 empty—decrease, 731 loaded and one empty.

Southern Freight Rates.

A new war in Southern freight rates has broken out, the Georgia associated traffic lines having made heavy cuts on rates from New York to Chattanooga, by way of steamship lines to Savannah. It is expected that the East Tennessee Co. will meet the reduction, and the trouble, which a few weeks ago threatened to break up the Southern Railway & Steamship Association, will be renewed.

Joint Executive Committee.

A dispatch from Indianapolis, March 11, says: "President Ingalls, of the Cincinnati, Indianapolis, St. Louis & Chicago Railway, has notified Commissioner Fink that on April 1 his road will withdraw from its membership in the trunk line pool, and will not thereafter be governed by the rulings of the Joint Executive Committee on either Indianapolis or Seneca pool business."

Transcontinental Traffic Association.

A Chicago dispatch reports that there will be trouble over the new rates, which were to have gone into effect March 20, the Central Pacific having sent notice to connecting lines that it will exact its full proportion of the old rates on all through shipments. This, if true, will prevent the present adoption of the new tariff.

RAILROAD LAW.

Collection of Freight Charges in Arkansas.

The following act has recently been passed by the General Assembly and approved by the Governor of Arkansas:

An act to regulate the collection of freight bills by railroad companies, their agents or employes:

SECTION 1. Be it enacted by the General Assembly of the state of Arkansas, that it shall be unlawful for any railroad company in this state, its officers, agents or employés to charge and collect from the owner, agent or consignee of any freight, goods, wares and merchandise of any kind or character whatever, a greater sum for transporting said freight, goods, wares and merchandise than is specified in the bill of lading.

SEC. 2. That any railroad company, its officers, agents or employés, having possession of any goods, wares or merchandise of any kind or character whatever, shall deliver the same to the owner, his agents or consignee upon payment of the freight charges as shown by the bill of lading.

SEC. 3. That any railroad company, its officers, agents or employés that shall refuse to deliver to the owner, agent or consignee any freight goods, wares and merchandise of any kind or character whatever, upon the payment or tender of payment of the freight charges due, as shown by the bill of lading, the said railroad company shall be liable in damages to the owner of the said freight, goods, wares or merchandise to an amount equal to the amount of the freight charges for every day said freight, goods, wares and merchandise is held after payment or tender of payment of the charges due, as shown by the bill of lading, to be recovered in any court of competent jurisdiction.

SEC. 4. That all laws or parts of laws in conflict with this act are hereby repealed, and this act to take effect from and after its passage.

Killing a Person—Presumption of Negligence.

In the case of Hoover against the Brunswick & Western Co., the Georgia Supreme Court holds as follows:

1. Where one is killed by a railroad company in running its trains, the presumption of negligence is attached by law to the company, and the onus is on it to show all ordinary and reasonable care by its officers and agents, or that the deceased's own negligence was the cause of the death, or that by ordinary care he could have avoided the consequences of the negligence of the company.

2. Where a homicide occurred from the running of a railroad train at a public crossing near a city, and where another railroad track ran along beside that on which the killing occurred, if it appeared that blow posts were not erected, the whistle was not blown, and the train was not checked, as required by law, the exercise of all ordinary and reasonable care was not shown, so as to rebut the presumption against the railroad.

3. The facts of this case do not show that the deceased caused his own death. If there was any negligence on his part, it was contributory; and the law being fairly and fully given in charge, the verdict of the jury on the subject of negligence, contributory negligence, the degree of each, and the apportionment of damages or the withholding any, is conclusive, if approved by the presiding judge, provided there be evidence enough to suport the finding.

4. The evidence did not show that the consequences of the negligence of the railroad could have been avoided and the disaster averted by the use of ordinary care on the part of the deceased.

Judgment affirmed.

OLD AND NEW ROADS.

Anniston & Chattanooga.—The Chief Engineer of this road reports that the preliminary survey shows that the distance by the proposed line from Anniston, Ala., to Chattanooga is about 120 miles. From 15 miles north of Anniston to Crawfish Springs the road passes over a continuous bed of red and brown hematite iron ore. South of Coosa River it passes through an extensive tract of yellow pine, while on most of the road there are large forests of hard wood of different varieties. In the Coosa and Chatooga valleys the land is very fertile, and there is some good cotton country. The road will be crossed by the East & West Railroad, giving it a direct connection with the Broken Arrow coal-fields.

Baltimore & Ohio.—It is understood that work is to be pushed as fast as possible on this company's short line from Washington, Pa., to the Pittsburgh Division, near Connellsville. The principal work on the line, the Brady tunnel, is very nearly finished, only some arching remains to be completed, and at other points the work will be finished as fast as possible. The line will be made double track from Wheeling to Connellsville. It will shorten the distance from Wheeling to Baltimore 43 miles, and will also have better grades than the present main line. When it is finished, all through business between Wheeling and Baltimore will go by way of Connellsville and Cumberland, and the present line from Wheeling to Grafton will be used for local business only.

Boston, Barre & Gardner.—The Fitchburg Railroad Company assumed the management of this road, under a temporary contract for one year, on March 9. The Fitchburg Co. has made a proposition to the city of Worcester to buy the stock in the road owned by the city—2,622 shares—at $10 per share in cash, or to exchange for it Fitchburg stock at the rate of 1 share for 10.

Boston & Maine.—This company, it is said, is negotiating for the purchase of the stock of the Boston & Bangor Steamship Co., with a view doubtless of controlling the freight business between Boston & Portland, for which this company's boats are powerful competitors with the railroads. It is stated that a definite offer has already been made by the Boston & Maine Co. and is now under consideration by the steamship company.

Brunswick & Western.—The Savannah (Ga.) *News* says: "Rumors have been current for some days in railroad circles in regard to the failure of the consummation of the supposed sale of the Brunswick & Western road last fall to the Plant system. The impression has prevailed among some that the trade made in August last between the Seligmans upon one part and Mr. Plant and associates upon the other—the former selling the road to the latter—had failed of consummation in consequence of a defect that had been found in the titles, and that the trade had been declared off. It is true that the objection referred to has been raised by the attorneys of the purchasing parties, and that the trade has failed of consummation, resulting in the election of a new board of directors by the stockholders of the Brunswick & Western, but it is understood that negotiations are still pending, and that there is yet a probability of the consummation of the trade. It is understood that the reason Captain John A. Davis and L. E. Welch, of Albany, members of the old board of directors, were left off the new board is because of the embarrassment under which they might be placed in the event of a suit between the parties to this trade, and for the further reason that it was deemed expedient to have a majority of the directors in New York, where the road is owned, so they could be called together without delay or expense pending further negotiations. Captain Davis, finding the trade had not been consummated within the time agreed upon—last August—tendered his resignation as President of the new company in October last, but the resignation was not accepted until tendered again before the election which took place in Brunswick last week."

Central Massachusetts.—The Boston *Advertiser* says: "The exact offer made by the Boston & Lowell Railroad management for the control and operation of the Central Massachusetts road, brief reference to which has heretofore been made, is as follows: The Boston & Lowell people to commence the operation of the completed section May 1, 1885, and additional sections as fast as finished. The Central was to bond its road at $15,000 per mile at 5 per cent., sufficient bonds to be retained to meet the interest for the first two years. During this period of two years the Lowell was to pay all other expenses than interest, and after the second year Lowell guaranteed the payment of the interest upon the bonds, and provided the gross earnings reached $600,000 per annum, then besides the payment of interest, taxes, etc., the Boston & Lowell agree to pay over to the Central stockholders for dividend purposes 10 per cent. of said earnings; if gross earnings per annum reached $1,000,000, 12 per cent., and at $1,500,000 or over, 15 per cent.; or, in other words, if after two years the gross earning reached $800,000, there would have been $80,000 available for dividend purposes; with gross earnings of $1,200,000 in any future year, the surplus dividends would foot up $144,000, and at $2,000,000 the result would give $300,000. The time of the proposed lease was for 99 years."

Chicago, Burlington & Quincy.—This company's statement for January is as follows:

	1884.	1883.	Inc. or Dec.		P. c.
Passengers.....	$321.649	$384,408	D.	$52,759	14.1
Freight.....	1,527.780	1,178,943	I.	348,817	29.6
Mail, etc	143,075	94,869	I.	48,206	50.7
Total.....	$1,992.484	$1,648,220	I.	$344,264	20 9
Expenses.....	1,129,954	1.012,706	I.	117,248	11.6
Net earnings....	$862.530	$635,514	I.	$227,016	35.7
P. c. of exps.....	56.7	61.5	D.	4.8	....

The statement for the first month of the year is thus a very favorable one. The large increase in freight earnings contrasts with the decrease in passenger receipts, and there was also a large increase in miscellaneous earnings.

The report that the company was about to build a cut-off from its St. Louis Division above Alton to some point on the Hannibal & St. Joseph road, is denied. Some surveys have been made, but there is no intention of building the line.

Chicago & Grand Trunk.—At the annual meeting, March 11, the report showed that considerable expenditure on capital account was made for improvements. The revenue was as follows: Gross earnings, $3,178,180; operating expenses, $2,415,503, leaving net earnings of $762,677, as compared with $716,478 for 1883. After providing for interest and rentals, there remains a balance of but $1,954. The small revenue is attributed to the low rates prevailing during the year. Freight earnings were only 0.57 cent per ton-mile. The tonnage carried during the year increased 21 per cent., but the earnings were only 8 per cent. larger than the year before.

The directors say that the pooling system has worked badly for the road, the system itself being not so much to blame as the failure of other roads to co-operate. The competition between the New York Central and the West Shore seriously affected the interests of the Grand Trunk, as well as Eastern roads, and is supposed to be one of the causes of the loss in revenue. The working expenses amounted to nearly 76 per cent. of the earnings—about the same as last year.

Chicago & Great Southern.—Mr. H. H. Porter, of Chicago, has begun proceedings in the United States Circuit Court in Indianapolis to compel John C. New, trustee under the mortgage on this road, to prosecute the foreclosure suit, which was once begun, but afterward dropped.

Chicago, Milwaukee & St. Paul.—It is stated that Blake Bros. & Co., who took $2,000,000 of this company's new terminal bonds, have decided not to exercise their option on the remaining $1,000,000. The firm has advanced $750,000 on these bonds, which the company will repay.

Cincinnati, Indianapolis, St. Louis & Chicago.—This company makes the following statement for January and the seven months of its fiscal year from July 1 to Jan. 31:

	1885.	1884.	Inc. or Dec.	P. c.
Earnings	$203 444	$170,318	I. $33,126	19.5
Expenses	134,096	114,452	I. 19,644	17.2
Net earnings	$69 348	$55,866	I. $13,482	24.1
Fixed charges	50,000	50.083	D. 83	0.2
Surplus, January	19,348	$5.783	I. $13,565	234.6
Surplus to Dec. 31	212,173	171,243	I. 40,931	23.9
Total surp., 7 mos	$231,522	$177,026	I. $54,496	30.8

The surplus is, for the present, applied to payment of floating debt and improvements of the road.

Cleveland & Southern.—This company has been organized to build a railroad from Cleveland, O., southward to Burbank on the New York, Pennsylvania & Ohio road, about 40 miles. A possible extension to Burlington, on the Ohio River, in Lawrence County, is part of the project.

Connecticut Central.—At a meeting of the directors of this company in Hartford, March 10, it was resolved to contest the suit for foreclosure of the mortgage on the road.

Connotton Valley.—An order of sale in foreclosure has been granted, and the sale will be made in about 60 days, the precise day to be fixed hereafter. Arrangements for a reorganization will soon be completed.

Ellsworth, Great Bend & Western.—This company has filed articles of incorporation in Kansas to build a railroad from Ellsworth, Kan., westward to Pueblo, Col., 370 miles, and from Great Bend, Kan., to El Paso, Tex., 550 miles.

Fitchburg.—As elsewhere noted, this company on March 9 began to operate the Boston, Barre & Gardner road under a temporary agreement. It is understood that the first step will be to put the road in good condition, and that when this is done fast passenger trains will be run from Worcester in connection with the express trains over the Hoosac Tunnel line. The company will also enter into competition for through freight business to and from Worcester.

Fort Madison & Northwestern.—This road has been placed in the hands of a receiver upon application of the creditors. It was originally intended to run from Fort Madison, Ia., to Oskaloosa, about 100 miles. In 1882 it was completed to Birmingham, 45 miles. The funded debt consists of $150,000 in first mortgage bonds and $6,000 in second mortgage bonds. The road is of 3 ft. gauge, and its earnings, although light, have, according to the reports made, been sufficient to meet the interest on the funded debt. The Fort Madison Construction Co. built and owned the road.

Illinois Central.—This company's earnings from traffic in February were:

	1884.	1883.	Inc. or Dec.	P.c.
Ill and So. Div.	$840 912	$813,699	I. $25.213	3.3
Iowa lines	100,839	131,643	D. 30,804	23.3
Total	$941,751	$945,342	D. $3,591	0.4

The earnings this year include $22,897 from the new branches of the Southern Division.

The Land Department reports sales of 953 acres for $4,740, and cash collections amounting to $5,343 for the month.

Indiana, Bloomington & Western.—An official statement in relation to the surrender of the Indianapolis, Decatur & Springfield road to the trustees by this company is that negotiations had been going on for some months past looking to the surrender of the lease of the St. Louis Division (the Indianapolis, Decatur & Springfield). When the lease was entered upon it was the intention to extend the line to St. Louis, but in view of the depression in business and the fact that the Decatur & Springfield parties were not able to cooperate, this idea had been relinquished. The St. Louis Division had been operated at a loss (on the minimum rental of $200,000) for some time past, and the arrangement for turning it over to its parent company was an entirely amicable one between the companies interested.

Juneau, Minnesota Junction & Milwaukee.—This is the name—nearly as long as the proposed road—of a company which has just been organized at Juneau, Wis., to build a railroad from that place to Minnesota Junction, on the Chicago, Milwaukee & St. Paul road, a distance of 3 miles. The company is now securing the right of way with a view to beginning work on its line early in the spring.

Kansas City, Clinton & Springfield.—The following circular from the President's Office is dated Kansas City, Feb. 12:

"The Pleasant Hill & De Soto Railroad Co. and the Kansas City, Clinton & Springfield Railroad Co., having this day been consolidated under the name of the Kansas City, Clinton & Springfield Railway Co., the railroad and other property heretofore belonging to each of said companies will, from and after this date, be operated by the consolidated company."

Kansas City, Springfield & Memphis.—A correspondent of the Boston *Advertiser* states the situation of the Kansas City, Springfield & Memphis and the Kansas City, Clinton & Springfield roads, and their relations to the Kansas City, Fort Scott & Gulf roads, as follows:

"The Kansas City, Springfield & Memphis Railroad was built in 1882 and 1883 in order to give the Kansas City, Fort Scott & Gulf Railroad through connection to the city of Memphis, and thus an outlet from Kansas City to the Gulf. The road is some 282 miles in length, and passes through rather the best part of the States of Missouri and Arkansas. It, however, passes through the Mississippi Valley, so that it is for a long distance liable to damage by overflows. It was not fully opened for traffic until May, 1884, since which time its earnings have steadily increased, so that they more than satisfy the projectors. At present the earnings of the road are somewhat increased, owing to the extra amount of work thrown on the road by overflows on other roads and the cut rates, by which a great deal of extra freight has found its way to the road.

"The Kansas City, Clinton & Springfield road is 61 miles long, and owing to the very low price of rails ($29 a ton), the estimated cost of the road is but $16,000 a mile. It is bonded at $20,000 a mile, bearing 5 per cent. interest, while there are only 9,000 shares of the stock outstanding and 9,000 belonging to the Fort Scott road. This road is, so to speak, simply a short cut from Kansas City to Springfield, saving about 35 miles over the present rail route of the Fort Scott road. The country through which it passes is of the same general character as that which surrounds the Fort Scott line, so, besides its through traffic, good local business can be expected."

Lake Shore & Michigan Southern.—Treasurer Worcester has issued a circular offering for sale $5,685,000 coupon bonds issued under the first consolidated mortgage, 7 per cent. interest, principal due in 1900. The terms upon which the bonds are offered are, $4,400,000 to be delivered on April 25, 1885, and $1,285,000 to be delivered on June 25, 1885, by the Union Trust Co., to which the amount due for each delivery at the price bid must then be paid. The proceeds of these bonds are to be applied to the payment of $6,835,000 in bonds of the Michigan Southern & Northern Indiana Co. and of the Cleveland & Toledo Co., falling due on May 1 and on July 1 next. Sealed proposals will be received till Thursday, March 19.

This company's statement to the New York Railroad Commissioners for the year ending Dec. 31 is as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Earnings	$3,880 041	$4,754.246	D. $874,205	16 3
Expenses	2,159,405	2,537,241	D. 377,836	14.9
Net earnings	$1,720,636	$2,217.005	D. $496,369	22.4
Other income		39,635	D. 39,635	
Total	$1,720,636	$2,256,640	D. $536 004	23.8
Int., rents and taxes	1,073,346	1,046,896	I. 26.450	2.5
Surplus	$647,290	$1,209,744	D. $562,454	46.5

The working expenses were 55.1 per cent. in 1884, against 55.7 in 1883. The surplus for the quarter was 1.3 per cent. on the stock for the quarter, against 2.4 per cent in 1883.

Lehigh Valley.—This company has completed the laying of track on the independent line extending from its coal dock and freight yards in Buffalo to a junction with the Erie track near the Buffalo city line. This track is about 2 miles long and is built on a high level, a large part of it being on trestle work, and crosses a number of street roads and railroad tracks on bridges.

The company reduces its quarterly dividend from 2 to 1½ per cent., after paying the former rate for several years. The reduction is a precautionary measure, in line with the usual conservative management.

Little Rock & Fort Smith.—This company has about completed a branch from its road at Coal Hill, Ark., to a coal property which some Chattanooga capitalists are engaged in developing. They have already struck a large vein of good coal and a considerable traffic is expected. The branch is two miles long, and the company has ordered three heavy engines to be used in hauling coal.

Louisville, Evansville & St. Louis.—The Court has authorized the Receiver to buy 500 tons of steel rails and to rent two locomotives, but has renewed its refusal to permit the issue of receiver's certificates. Judge Gresham, in giving this decision, again gives notice to the bondholders that he will insist upon an early foreclosure of the mortgage, and that he does not intend to permit the road to remain for an indefinite time under the management of the Court. He further stated that no receiver's certificates would be allowed by him except in case of the most urgent necessity, which did not now exist.

Louisville & Nashville.—This company's statement for January and the seven months of its fiscal year from July 1 to Jan. 31 is as follows:

	January.		Seven months.	
	1885.	1884.	1884-85.	1883-84.
Earnings	$1,170,749	$1,039.317	$8.276.969	$8.834,182
Expenses	713,769	735,875	4,647,305	5.257,893
Net earnings	$456,980	$303,442	$3,629,664	$3,575,289
Per cent of exps.	61.0	70 8	56.1	59.4

For the seven months the gross earnings show a decrease of $557,213 (6.3 per cent.) and the expenses a decrease of $610,588 (11.6 per cent.), the result being a net increase of $53,375, or 1.5 per cent.

Manhattan.—This company makes the following statement for the current quarter, March estimated:

Earnings	$1,778,438
Expenses	928,475
Net earnings	$849,963
Interest, rentals and taxes	415,069
Surplus	$434,894

The quarterly dividend (1¼ per cent.) will take $390,000, leaving a balance of $44,894. Adding the surplus for the preceding quarter there remains a surplus over dividends of $82,468 for the half-year.

Marquette, Houghton & Ontonagon.—The Marquette *Mining Journal* says of this company's purchase of the Marquette & Western road: "We have reason to believe that this sale is part of a general agreement, by the terms of which the M., H. & O. is to at once complete its line to a point of junction with the Milwaukee, Lake Shore & Western, and the Detroit, Mackinac & Marquette is to build through to Sault Ste. Marie. The Canadian Pacific is now within 60 miles of the Sault, we understand, and will push its line to that point without delay when assured that the connecting line is progressing to meet it. The completion of all these lines as indicated will give us the through route between the seaboards, so essential to the rapid developments of the material resources and commercial interests of this region, and for which our people have waited so long and patiently.

"Until we have further knowledge of the plans and purposes of the two companies immediately interested, it would be idle to speculate upon what effect the sale of the M. & W. to its rival will have upon the mining industry of Marquette County, but we feel justified in assuming that it will not be followed by any attempt on the part of the purchasing company to hamper that industry by rates on ore freights not warranted by the existing condition of the iron market. Only in that event would the change operate to the disadvantage of the mines of the Marquette range, and as such a policy would be a suicidal one for the company which now owns both roads, we have no idea that it will be adopted."

Memphis & Charleston.—It is again reported that the lease of this road to the East Tennessee, Virginia & Georgia Co. will shortly be terminated. The matter was discussed at a meeting of the directors held in New York last week, but no action was taken. It is claimed that the Memphis & Charleston Co. owes nothing now to the lessee. One of the conditions of the lease was that the Memphis & Charleston should pay up all advances made by the lessee for improvements of the road, or for payments of interest or for other claims before withdrawing from the contract. Another meeting will shortly be held, at which, it is said, the question will be settled.

It is said that the Kansas City, Springfield & Memphis Co. is willing and anxious to lease the road in case the East Tennessee lease is cancelled.

Mexican Railroad Notes.—The following notes are from the *Mexican Financier* of Feb. 28:

The following railroad concessions have lapsed on account of the failure of the companies to begin work within the time stipulated. The country is to be congratulated on the harmless results of most of these concessions:

1. San Juan Bautista to Minatitlan or Coatzacoalcos.
2. Teotihuacan to Irolo.
3. Pátzcuaro and Morelia to a point on the Mexican Central.
4. Polotitlan or Cazadero to Aculco.
5. Mier to Guerrero, Tamaulipas.
6. Campeche to Tixmicuz.

A line of diligences has been recently established between Durango and the station of Jimulco on the Mexican Central, to connect with the trains of that railroad.

Missouri, Kansas & Texas.—The following statement is published for the year ending Dec. 31:

	1884.	1883.	Decrease.	P. c.
Earnings	$7,317,250	$7,843,511	$526,261	6.7
Expenses	4,503,113	4,769,581	266,468	5.6
Net earnings	$2,814,137	$3,073,930	$259,793	8.5
Fixed charges	2,450,000	2,492,516	42,516	1.7
Balance	$364,137	$581.414	$217,277	37.4

Taxes ($155,867 last year) are included in expenses. The surplus was applied to reduce the debit balance of income account. The decrease in fixed charges was due to the exchange of 6 per cent. incomes into 5 per cent. bonds. The statement does not include the miscellaneous debit and credit account.

Missouri Pacific.—On the application made on behalf of the state of Missouri, to restrain this company, Jay Gould and others from voting on the stock held by the company in the St. Louis, Iron Mountain and Southern road, the Circuit Court in St. Louis has denied the application. The Court held, that from the testimony and arguments presented, it was claimed that any proceeding in the case would have to be by quo warranto, and that the fact of the violation of the charter, if such violation existed, would have to be proved, like any other fact, in a jury trial. Nothing has been shown to warrant the issue of an injunction as asked for.

The strike of the shop men of this company against a reduction in wages, which began last week, has extended over all the company's line and those of its leased and controlled roads, only a few men in the St. Louis shops remaining at work. The strikers have not been satisfied with stopping the work in the shops, but have put a stop to all freight traffic, stopping trains at the division stations and drawing the fires from the engines. This movement began on the Texas & Pacific, and extended thence to the other Texas lines and the Missouri, Kansas & Texas, and finally to the main line. The trainmen, while not joining in the strike, evidently sympathize with the strikers, and have not resisted them, or attempted to move trains when stopped by them, and the result is a complete blockade of freight movement. Passenger trains have not been stopped except on some of the Texas lines, where the passenger cars were detached and only the engine and mail car allowed to go on.

While the strikers in Missouri and Kansas are determined, the feeling appears to be especially bitter on the Texas lines, and trouble is feared there. The company has applied to the state authorities for protection, and at latest accounts the Governor had ordered militia to Palestine, Hearne, Fort Worth and Marshall to protect the company's property. A large amount of freight is detained at the principal stations, including much perishable property, and business is seriously embarrassed.

Mobile & Ohio.—This company's statement for January and the seven months of its fiscal year from July 1 to Jan. 31 is as follows:

	January.		Seven months.	
	188	1884.	1884-8	1883-84.
Earnings	$201.681	$179,228	$1,385,707	$1,471,757
Expenses	147,844	127.790	943,203	896 981
Net earnings	$53,837	$51,438	$442,504	$574,776
Per cent. of exps.	72.2	70.4	68.1	60.9

For the seven months the decrease in gross earnings was $86,050 (5.9 per cent.) and the increase in expenses $46,222 (5.1 per cent.), the result being a decrease of $132,272 (23.0 per cent.) in gross earnings.

New York Central & Hudson River.—This company reduces its quarterly dividend from 1¾ to 1 per cent. a change which was not unexpected. The rate is now one-half of that maintained for a number of years. The following statement is made for the quarter, March estimated, and is compared with actual figures for last year:

	1885.	1884.	Inc. or Dec.	P.c.
Earnings	$6 336.000	$6,710.591	D. $374,591	5 6
Expenses	3,904,000	4,218,893	D. 314,893	7.5
Net earnings	$2,432.000	$2,491.698	D. $59,698	2.4
Fixed charges	1,485,000	1,395,000	I. 90,000	6.5
Surplus	$947,000	$1,096,698	D. $149,098	13.7

The expenses were 61.6 per cent. of gross earnings this year and 62.9 per cent. last year. The surplus for the quarter was 1.05 per cent. on the stock, against 1.22 per cent. last year.

The earnings have been reduced by the West Shore competition and the low through rates prevailing, while the expenses were largely increased by the severe weather and frequent snow-storms.

At the meeting of the board held March 6 resolutions were adopted approving the policy of reducing both through and local rates to meet competition and retain business.

New York, Lake Erie & Western.—This company has paid over the rental due the Buffalo & Southwestern Co., and the interest on the bonds of that company, on which default was made Jan. 1, is now being paid.

New York & New England.—The Receiver has agreed with the State Treasurer of Connecticut upon a compromise, under which he is to pay to the state $150,000 in full for all taxes now due on the road; one-half the amount to be paid by Aug. 1 next, and the balance by May 1, 1886. This compromise will have to be approved by the Legislature before taking effect.

New York, West Shore & Buffalo.—It is said that the bondholders' committee has decided to present a plan of reorganization to the bondholders, which will secure a reorganization of the company without foreclosure; thereby effecting a settlement without the delay required by foreclosure and sale and the accompanying settlements of the many claims against the company, which would have to be effected through the courts.

A plan has been prepared by other parties which will also, it is said, be submitted to the bondholders. This plan provides generally for the issue of new first-mortgage bonds to the amount of $10,000,000, for the purpose of completing the road, buying equipment and other necessary purposes. The present first-mortgage bonds it is proposed to exchange for preferred stock; an issue of second-preferred stock to be made for the claims of the North River Construction Co. and other preferred debts, and an issue of new common stock to be made for the present common stock, the holders of which will be asked to pay an assessment. This plan, it is said, was submitted to the bondholders' committee, and it is believed that its chief provision will be embodied in that committee's plans.

The Union Terminal Co., which owns the passenger station used by this road and the Buffalo, New York & Philadelphia in Buffalo, on March 11 shut out West Shore trains, taking up rails to prevent any attempt to run them into the station. The reason for this action is not stated.

Northern Pacific.—This company reports as follows for January and the seven months of the fiscal year from July 1 to Jan. 31:

	January.		Seven months.	
	1885.	1884.	1884-85.	1883-84.
Earnings	$553,582	$614,102	$7,181,301	$7,232,091
Expenses	440,574	449,293	3,708,724	4,146,006
Net earnings	$113,008	$164,809	$3,472,577	$3,086,085
Per cent. of exps.	79.5	73.2		57 3

For the seven months the gross earnings decreased $50,790, or 0.7 per cent.; the expenses decreased $437,282, or 10.5 per cent., the result being an increase of $386,492, or 12.5 per cent., in net earnings.

Pacific, of Missouri.—In St. Louis last week Daniel S. Miller filed a bill in equity against the old Pacific Railroad Co., of Missouri. The bill is filed to recover under certain judgments secured several years ago, and recites the facts in relation to the sale of the company's property under foreclosure of the third mortgage and its purchase by persons who organized the present Missouri Pacific Co. No meeting of the stockholders, so far as plaintiff is informed, has been held since 1877, and since then there have been no persons authorized to act for the old company or to manage its affairs, and no records have been kept. The bill represents that there are sums due to the old company from various sources, and that it has equitable interests of various natures which ought to be preserved and applied to the payments of its debts. The Court, after hearing argument, granted an order appointing R. Wood Cruttenden Receiver of the company, restricting his powers necessarily to the jurisdiction of the Court. Subsequently the Receiver filed his bond and obtained leave to employ counsel and institute proceedings to recover certain claims of the company against the United States, which were recently decided in its favor in the Court of Claims at Washington.

This appointment, it appears, does not in any way affect the present Missouri Pacific Co., referring only to such claims and assets of the old company as were not transferred by the foreclosure, nor has it any reference to the suit which was begun some time ago to set aside that foreclosure. It is open to any creditors of the old company who may desire to join with Mr. Miller in his suit.

Pennsylvania.—At the annual meeting in Philadelphia, March 10, the usual resolutions approving of the report were passed. In answer to questions put by stockholders present, President Roberts said that the new contract with the Pullman Co. was more favorable than the old, as it relieved the Pennsylvania Railroad Co. from the payment of car mileage. It was based on the principle that the party furnishing the car is to maintain it. It is estimated that under this contract the expense of the sleeping car service would be decreased not less than $350,000 and not more than $500,000. The contract is for 5 years, and every 3 years thereafter the company will have the option of terminating it. It does not include parlor cars, but sleeping cars only, as the company intends to run its own parlor cars hereafter.

In answer to another question Mr. Roberts repeated the explantion given in the report of the settlement with the Pittsburgh, Fort Wayne & Chicago Co.

Mr. Parker brought up the question raised by him at several previous meetings, in relation to the expenditure of the net earnings on improvements of the road; claiming that such expenditures were an improper diversion of the money which ought to go to the stockholders. A little discussion followed on this point, and also on another question brought up by Mr. Lockwood, in relation to the Adams Express contract. The discussion, however, resulted in nothing.

Mr. Roberts further explained that the reduction in the net earnings of the western lines was due entirely to the falling off in rates on traffic, and said that every possible effort had been made to reduce the expenses.

A resolution was offered, authorizing the board to have a stock vote taken on the question of reducing the appropriation to the trust of Oct. 9, 1878, for the purchase of securities of leased and controlled lines, from $50,000 monthly to an amount equal to 1 per cent. of the net income of the company before payment of dividends, and directing the board to give the necessary 90 days' notice of the taking of such vote. An amendment to the effect that the trust be abolished altogether was voted down and the resolution was adopted.

After appointing the usual committee to nominate directors, to be voted for at the annual election, the meeting adjourned.

Philadelphia & Reading.—The Receivers' cash account for January, as audited by the Master, is as follows:

	Railroad Co.	Coal & Iron Co.
Cash on hand, Jan. 1	$55,619	$2,813
Receipts from all sources	2,409,797	1,308,252
Total	$2,465,416	$1,311,065
Disbursements	2,382,982	1,308,282
Cash on hand, Feb. 1	$82,434	$2,783

Reports were current in Philadelphia early in the week to the effect that Mr. Vanderbilt had agreed to aid the directors' plan of reorganization by taking a large amount of the collateral trust loans, which will be necessary to insure the success of that plan. These reports, however, do not seem to have any solid foundation.

Pittsboro.—This company having been chartered by the North Carolina Legislature, the incorporators held a meeting last week and completed a temporary organization. Books for subscription to the stock were ordered to be opened, and as soon as the amount required by the charter has been subscribed a meeting will be held to complete a permanent organization of the company. The proposed line is from Pittsboro, N. C., to Moncure, on the Raleigh & Augusta Air Line, 10 miles.

Pittsburgh & Western.—The Pittsburgh *Chronicle-Telegraph* of March 7 says: "The interest in the affairs of the Pittsburgh & Western Railroad Co. was as lively as ever today, and despite the denials of the correctness of our publication of yesterday, it is now stated that the company is not only bankrupt, but has practically been so for three years past; that the time has come when the judgments against the concern, staved off as long as possible, must be met, and that the next move will be to put the road into the hands of a receiver. It is stated positively to-day that the papers have been drawn up asking for the appointment of a receiver, and will soon be presented in court. It is further stated that the syndicate controlling the stock of this company, was represented here by Wm. Semple and James Callery, in New York by E. D. Morgan & Co., and in Baltimore by the Baltimore & Ohio Railroad Co., the first two parties holding 37½ per cent. and the last 25 per cent. The syndicate is said to be under pledge, under the agreement made with the B. & O. last summer, to provide money to meet the July interest on the bonded indebtedness, the amount of bonds outstanding being $5,170,500. It is further stated that the April interest on the $800,000 of the Pittsburgh, Bradford & Buffalo bonds guaranteed by the Pittsburgh & Western will not be paid, and that the mortgage will be foreclosed. This will not hurt the latter corporation, however, as it will be releasing it from an unprofitable northern line without interference with its western system.

"As to the effect of a receivership on the securities of the Pittsburgh & Western opinions differ. But as the road is not likely to be able to earn enough under a receiver to pay expenses and fixed charges the holders of securities are not likely to profit much by the change of management, especially as it will, no doubt, be the policy of the Baltimore & Ohio as lessee to give the road as little business as possible. In almost any event it is considered certain that the road will eventually be brought to the hammer, and that the B. & O. will buy it in. The bonds, which yesterday sold at 62, were to-day offered at 59 with no takers."

The road extends from Allegheny, Pa., to New Castle, 61 miles, with 18 miles of branches, and it owns also a narrow gauge line (formerly the Pittsburgh, Bradford & Buffalo) from Callery Junction, 26 miles from Allegheny, to Mt. Jewett, 139 miles, with a branch of 6 miles to Clarion, Pa. Last summer the company leased the Pittsburgh, Cleveland & Toledo road, extending from New Castle Junction westward to Akron, O., 77 miles. The road grew out of a short narrow gauge line running from Pittsburgh to New Castle, and known as the Pittsburgh, New Castle & Lake Erie. This was reorganized and consolidated with the Pittsburgh, Bradford & Buffalo. It is of value to the Baltimore & Ohio, especially for its entrance into Allegheny. To complete the connection between the two roads the Pittsburgh Junction road was built last year at a heavy cost.

The funded debt consists of $4,095,000 first 6s; $275,500 consolidated bonds and $800,000 Pittsburgh, Bradford & Buffalo first 6s, assumed at the time of the consolidation with that road. The net earnings by the last report (for 1883) were $77,427, or only about one-fourth of the yearly interest on the bonds.

Rochester & Pittsburgh.—The New York Supreme Court has rendered a decision declaring that the bondholders are entitled to a decree of foreclosure and sale under their petition. The Court has appointed John M. Davy, of Rochester, Referee, to ascertain the amount due the bondholders, and to receive proof of their claims. He is instructed to present his report by March 28, and a hearing on the adoption of the report and the final decree in the case will be held April 1 next.

Rome, Watertown & Ogdensburg.—This company's statement gives the following figures for January and the four months of the fiscal year from Oct. 1 to Jan. 31:

	January.		Four months.	
	1885.	1884.	1884-85.	1883-84.
Earnings	$114 395	$81,040	$584,086	$532,182
Expenses	88,960	94,353	382,410	384,643
Net earnings	$25,435	$13,313*	$201,676	$147,539
Rents	542	603	2,170	2,681
Total net	$25,977	$12,710*	$203,846	$150,220

* Deficit.

For the four months the increase in gross earnings was $51,904, or 9.8 per cent.; in net earnings, $54,137, or 36.6 per cent.; in total net income, $53,626, or 35.7 per cent. Taxes are included in expenses.

St. Andrews Bay.—Work is soon to be begun on the proposed line from St. Andrews Bay, Fla., northward to Chipley on the Pensacola & Atlantic road. It is said that sufficient subscriptions have been secured to build this section of the road. When this is completed work will be begun on the extension of the road from Chipley northward into Alabama.

St. Joseph & Western.—A plan for the reorganization of this company has been adopted under which the present securities will be retired and canceled, and the company will be consolidated with the corporation owning the bridge over the Missouri at St. Joseph. The consolidated company will issue $5,000,000 of stock, $7,000,000 first-mortgage 6 per cent. bonds and $1,600,000 in income bonds. The income-bonds will replace the present second-mortgage bonds. The stock will take the place of the present stock and the first-mortgage bonds will be exchanged for the present divisional bonds, leaving $500,000 in the treasury to be used for improvements of the road. The road will continue to be operated as an independent line, although the Union Pacific owns a large interest in it.

St. Louis & San Francisco.—This company's preliminary statement for the year ending Dec. 31 is as follows:

	1884.	1883.	Inc. or Dec.	P.c.
Earnings	$4,643,596	$3,896,565	I. $747,031	19.2
Expenses	2,135,378	1,823,128	I. 312,250	17.3
Net earnings	$2,508,218	$2,073,437	I. $434,781	21.0
Fixed charges	1,826,203	1,354,439	I. 471,764	34.9
Surplus	$682,015	$718,998	D. $36,983	5.1

The expenses (which include taxes and improvements, $181,801 last year) were 46 per cent. of gross earnings in 1884, against 46.8 in 1883. The earnings last year were $5,906 gross and $3,190 net, the average road worked being 783 miles, against 734 miles in 1883.

St. Louis Coal Railroad.—On application of the creditors this road has been placed in the hands of a receiver.

The company owns only 10 miles of track, extending from Carbondale, Ill., to Harrison Junction, but it leases the Carbondale & Shawneetown road, 17½ miles; the St. Louis Central, 23½ miles, and the Wabash, Chester & Western, 42 miles, operating in all 93 miles of track. The funded debt of the company consists of $100,000 first mortgage bonds, and $50,000 income bonds, but under its rental contracts it was required to pay interest on $750,000 bonds of the leased lines.

Savannah, Florida & Western.—This company has located a branch from its main line at Quitman, Ga., southwest to Monticello, Fla., about 30 miles, and is now securing the right of way. The people on the line, it is said, are generally willing to give the necessary land to the company.

Southeastern, of Canada.—The Grand Trunk Co. has refused to take the passenger trains of this road into Montreal any longer, so that the through express from Boston, which has heretofore been run over the Passumpsic and the Southeastern roads, will have to be sent by way of White River Junction and the Central Vermont. The Southeastern people propose to take action to compel the Grand Trunk Co. to continue the former through line.

Spartanburg & Cranberry.—It is proposed to build a narrow-gauge railroad from Spartanburg, S. C., northward to a connection with the East Tennessee & Western North Carolina road at Cranberry, N. C. The distance is about 100 miles, and it is thought that a sufficient amount to meet over one-half the cost of the road can be secured in county and town subscriptions.

Talbot & Marion.—A company has been organized to build a railroad from Bostick in Talbot County, Ga., on the Central Railroad, southward to Tazewell, in Marion County about 16 miles. The line is parallel to the Buena Vista road, recently completed, but some little distance to the eastward.

Toledo & Indianapolis.—This road has been transferred by the Receiver to the bondholders, who bought it at foreclosure sale. They have organized the Toledo & Southwestern Co., and expect, as soon as the necessary arrangements can be made, to complete the road to a connection with one of the lines to Indianapolis.

Troy & Greenfield.—The Hoosac Tunnel Committee of the Massachusetts Legislature is giving a hearing to all parties interested in relation to the disposition to be made by the State of this road. A large number of persons have been heard, and numerous plans proposed. The hearing will be continued through next week.

Ulster & Delaware.—When this road (then the Rondout & Oswego) was built, a number of the towns on the line issued bonds in aid of its construction. It was intended to run to Oneonta, on the Albany & Susquehanna road, but work was stopped at Stamford, leaving several of the towns which had issued bonds without a railroad. Recently a bill was introduced into the New York Legislature to authorize a change of the line and an extension of the road from Stamford to Delhi, instead of Oneonta. The bonded towns resent this, and have applied to the Railroad Commission to take steps to require the company to build its road through on the original line. They offer, if this is done, to give the right of way through their limits.

Versailles & Midway.—This road is to run from Versailles, in Woodford County, Ky., northward about 9 miles to Midway, on the Lexington Branch of the Louisville & Nashville. The county is asked to subscribe $50,000 to the stock of the road, and an election is to be held March 14 to decide the question, which has caused a good deal of local excitement. The building of the road probably depends entirely upon the result of this vote.

Vicksburg & Meridian.—Contracts have been let for the building of an incline at Vicksburg and of another at Delta on the opposite side of the river, and for a large transfer boat to be used in transferring cars across the Mississippi between this road and the Vicksburg, Shreveport & Pacific, thus completing the connection between the two roads and doing away with the high charge heretofore paid for the transfer of passengers and freight at this point. The contracts call for the completion of the incline within four months from the present time.

Wabash, St. Louis & Pacific.—The Receivers make the following statement to the Court, concerning the operations of certain of the company's lines for which distinct accounts were ordered kept, for the quarter ending Sept. 30:

	Earnings.	Expenses.	Net or def.
Cairo Division	$148,958	$191,355	D. $42,397
Centreville, Moravia & Albia	11,368	11,134	N. 234
Champaign, Havana & Western	63,719	63.346	N. 373
Detroit, Butler & St. L	179.461	152,027	N. 27,434
Eel River	102,648	118,439	D. 15.791
Havana, Rantoul & Eastern	15,110	23,383	D. 8,273
Iowa Division	114,986	103,520	N. 11,466
Indianapolis, Peru & Chi	152,519	136,457	N. 16.062
Quincy, Missouri & P	44,271	53,393	D. 9,022
Toledo, Peoria & Western	324,145	289.674	N. 34,471

The strike of the workmen in the shops of this road has assumed serious proportions. Nearly all the men in the shops west of the Mississippi are out, and they have not only stopped the work in the shops, but have also for the time prevented the movement of freight, taking the engines from trains and drawing the fires. Passenger trains have not been stopped. No attempt has been made to interfere with the property of the company, which is guarded by United States deputy marshals, the Receivers having procured authority from the court to that effect. At Moberly, Mo., the Receivers attempted to resume work by leasing the shops there to the Missouri Car & Foundry Co., but the men generally refused to work for the lessee, although it offered to pay the old rates of wages.

East of the Mississippi the strike appears to be confined thus far to the shops at Fort Wayne, Ind., and Springfield, Ill. The trainmen have not struck, but they have not resisted the strikers who prevent the movement of freight.

Warren & Sugar Grove.—This company has been organized at Warren, Pa., to build a narrow-g auge road from that place, where itwill connect with the Philadelphia & Erie, to Ashville on the New York, Pennsylvania & Ohio, and thence to Mayville, N. Y., and around to Chautauqua Lake. The principal object of the road is the summer pleasure travel and excursion business to the lake, which is very large and is increasing every year. The company has been organized in Pennsylvania, but not in New York as yet.

Western Union Telegraph.—This company's statement for the quarter ending March 31 (March estimated) compares with the corresponding statement for last year as follows:

	1885.	1884.	Inc. or Dec.	P.c.
Net revenue	$1,350,000	$1,650,000	D. $300,000	18.0
Int. and sink. fund	143,500	126,420	I. 17,080	13.5
Balance	$1,206,500	$1,523,580	D. $317,080	20.8
Dividend	1,199,835	1,399,380	D. 199,965	14.8
Balance	$6,665	$123,780	D. $117,115	94.6
Surplus Jan. 1	4,231,667	3,970,931	I. 26,736	6.6
Total surplus April 1	$4,238,332	$4,094,741	I. $143,021	3.5

Last year the dividend for the quarter was 1¾; this year it is 1¼ per cent., and it will be seen that there is practically no surplus left for the quarter.